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Affective Responses to Images in Print Advertising: Affect Integration in a Simultaneous Presentation Context

by

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ABSTRACT

The distinction between cognitive and affective stimuli has been repeatedly made in the marketing literature (see e.g., Bagozzi, Gopinath, and Nyer 1999), with affect considered as a *valenced feeling state* (Cohen and Areni 1991). Considerable effort has been placed on the examination of how cognitive information is integrated, however research regarding affect integration is still in its infancy. Prior affect integration research (e.g., Fredrickson and Kahneman 1993) has primarily focused on the mechanism by which individuals combine *sequentially* presented affective stimuli of *common* valence (i.e., the integration of positively valenced stimuli or negatively valenced stimuli, but not both in the same affective experience). This stream of research provides support for a non-compensatory mechanism, where the peak affect experienced and the affect at the end have a disproportionate contribution to the overall affect experienced. Previous research has not examined the affect integration mechanism when the affective stimuli are presented simultaneously. With the exception of few studies, prior research has also neglected the integration of oppositely valenced affective stimuli.

Five experiments have been conducted to examine how individuals integrate both *commonly* and *oppositely* valenced affective stimuli when stimuli are *simultaneously* presented. This is investigated in a context of print advertising which utilizes affect generating images. Findings from Experiment 1 suggest that when affective stimuli are of the same valence, a peak mechanism explains overall response. However, results from Experiment 2 and Experiment 3 indicate that when stimuli with different valences of the same intensity or differing intensity are simultaneously presented, a compensatory mechanism is observed. The findings from Experiment 4 demonstrate that, within a simultaneous presentation context, when combining only positive or only negative stimuli of the same intensity, an increase in the frequency (number) of stimuli does not increase overall positiveness or negativeness. The results from Experiment 5 indicate that, within a simultaneous presentation context, when combining both positive and negative stimuli of the same intensity, an increase in the frequency of positive (negative) stimuli increases overall positiveness (negativeness). The results from these experiments provide managerial implications for advertisers and marketers. Future research avenues in affect integration are also explored.

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To Rokeya.

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CHAPTER 1: INTRODUCTION

The distinction between cognitive and affective stimuli has been repeatedly made in the marketing literature (see e.g., Bagozzi, Gopinath, and Nyer 1999 for a review; Zajonc and Markus 1982), with affect considered as a *valenced feeling state* (Cohen and Areni 1991). Research findings have demonstrated that human judgments and decisions are strongly influenced by affective responses to the target stimuli. In some conditions, affective reactions may be more important than the cognitive information related to the target. Studies have shown that preferences toward stimuli can be formed from the valence of affect generated by the stimuli (Gorn, Goldberg, and Basu 1993; Levine, Wyer, and Schwarz 1994) or from the intensity of affect generated by the stimuli (Gorn, Pham, and Sin 2001). The "how-do- I- feel-about-it" heuristic (Schwarz and Clore 1983, 1988) proposes that the affective states of individuals can influence the evaluation of target stimuli. Pham (1998) demonstrated that the "how-do-I-feel-about-it" heuristic is more likely to be used by consumers when they have consummatory motives (i.e., consumption behaviours that are rewarding in themselves) as opposed to instrumental motives (i.e., consumption behaviours that are not intrinsically rewarding but are conducted to achieve another goal). Pham, Cohen, Pracejus, and Hughes (2001) provided evidence that compared to assessments based on cognitive information, evaluations based on affective information are faster, more stable across individuals and more predictive of the valence of individuals' thoughts. Collectively, this stream of research endorses the view that in addition to cognition, affect has a strong role in human decision making.

The importance of emotions in judgments has been firmly established, however an issue that requires further investigation is related to how consumers integrate different elements of affective information generated by the same target stimuli in order to provide an overall affective evaluation of that stimuli. According to the "affect-as-information" literature (Clore, Schwarz, and Conway 1994; Clore et al. 2001; Schwarz 1990; Schwarz and Clore 1996), consumers use the affect generated by the target as information to form evaluations regarding the target. This indicates that if stimuli generate diverse affective information, understanding how consumers reach an overall affective response is essential to understand the decision making process of consumers. However, in the marketing literature, considerable effort has been placed on the examination of how cognitive information is integrated and research regarding affect integration is still in its infancy.

Many studies have focused on how consumers integrate cognitive information (see e.g., Anderson 1981; Bettman, Johnson, and Payne 1991 for a review), particularly considering the limited information processing abilities of consumers. The use of different types of rules and heuristics in processing cognitive information has been reported in the literature (e.g., Alba and Marmorstein 1987; Simon 1955; Tversky 1969; Tversky 1972; Russo and Dosher 1983) illustrating that information integration is seldom a simple additive function whereby all pieces of cognitive information are given equal weight and combined to form an overall evaluation. Pham (1998) states that "in this stream of research, the overall evaluation of each alternative is considered the product of some attribute-based computation varying in degrees of complexity." The complexity of the rule depends on the motivation and processing limitations of the decision maker. Given the demonstrated importance of affect in decision making, it is clear that understanding how consumers integrate diverse affective information to form an overall valenced feeling state is similarly an important research question.

In the domain of marketing, there are numerous contexts within which consumers may be exposed to different types of affective information generated by the same stimuli. The most obvious example of this is in marketing communication, where advertisements using affective information to persuade consumers are common place. All forms of advertising (radio, TV, print, outdoor etc.) are capable of utilizing different types of affective elements (both negative and positive) to influence consumers. Researchers have classified certain types of advertising as emotional advertising (e.g., Friestad and Thorson 1986) and transformational advertising (e.g., Puto and Wells 1984), where *emotional* and *transformational* advertising are related to affect based persuasion. Van Raaij (1989) stated that the primary affective response to an advertisement determines whether further elaborative processing of the advertising will occur. Furthermore, researchers have found that advertising may lead to the co-occurrence of both positive and negative emotions and both contribute to the effectiveness of the advertising (Edell and Burke 1987). Prior research has also demonstrated the impact of emotions generated by the advertisement on attitudes toward the advertisement (Batra and Ray 1986; Holbrook and Batra 1987). Affective responses to the advertisement can also directly impact attitudes toward the brand

(Burke and Edell 1989; Derbaix 1995; Stayman and Aaker 1988). Overall, the role of emotions in advertising effectiveness is well established and thus, understanding how consumers integrate the emotional responses generated by advertisements is of consequence.

In addition to advertising, other marketing contexts such as product purchase/usage may also be relevant in terms of affect integration as consumers have both positive and negative feelings arising out of such consumption experiences, and overall satisfaction derived is a combination of these affective responses. Westbrook (1987) demonstrated that both positive and negative affective experiences with product usage impacted satisfaction, complaining behaviour and consumer word-of-mouth. Westbrook and Oliver (1991) found that satisfaction is affected by three independent affective dimensions: interest, pleasant surprise and hostility. Oliver (1993) showed that overall satisfaction is a function of positive affect, negative affect, attribute satisfaction, attribute dissatisfaction and expectancy disconfirmation. Mano and Oliver (1993) indicate that both positive and negative affect and arousal in addition to product evaluations impact satisfaction. Phillips and Baumgartner (2002) developed and empirically tested a model that states that consumers have an affective expectation of the product consumption experience, generate both positive and negative emotions from the actual product consumption and compare the expected and experienced affective responses leading to overall satisfaction or dissatisfaction. Yi and Baumgartner (2004) identified coping strategies to mitigate the negative emotions (anger, disappointment, regret and worry) that may arise in purchase situations. Overall, the research on satisfaction has identified that consumption situations generate various emotions that impact satisfaction. Furthermore, Hirschman and Holbrook (1982) and Holbrook and Hirschman (1982) introduced the concept of "hedonic consumption", which implies that in some cases the goal of experiencing emotions is the primary motivation of consumption behavior. Research on affect integration will allow for greater insights into how consumers integrate different types of emotions resulting from consumption experiences.

As will be explained in more detail in the next section, research regarding affect integration has only recently been initiated. In prior research where affect integration has been the focus of study, the context is one in which there is strong control of the *sequence* with which the affective stimuli are presented. In other words, affect integration has only been studied in a context where researchers have been interested in understanding how individuals integrate emotions presented sequentially one after another (e.g., in a TV advertisement which has a weak positive emotional beginning, followed by a strong positive emotional ending). Further, with the exception of a few studies, prior research directly examining affect integration has focused on the integration of affective stimuli of *common* valence (i.e., the integration of positively valenced stimuli or negatively valenced stimuli, but not both in the same event). Thus, there are gaps in the literature in terms of theory development related to affect integration. Although research investigating sequential affect integration is a significant and important first step in understanding how consumers integrate affective information, it does not provide a complete picture of the affect integration process. In order for a more comprehensive theory of affect integration to evolve, it is imperative to also consider the integration process arising from a *simultaneous* presentation both in terms of *univalence* affective integration (when only positive or only negative stimuli are integrated) and the integration of *oppositely valenced* affective stimuli (when both positive and negative stimuli are integrated).

The investigation of affect integration in a simultaneous presentation context is important not only from a purely theoretical standpoint, but also from a managerial perspective. Certain forms of advertising (e.g., print advertising, outdoor advertising etc.) utilize simultaneous presentation of different types of emotional elements (both negative and positive) where there is no explicit control of the sequence in which the consumer is exposed to affective stimuli. Other forms of marketing communication such as in-store displays and websites also use multiple affective stimuli. Furthermore, in product consumption situations positive and negative affective responses may co-occur within the context of a single consumption event, similar to a simultaneous affect integration process. Taking into consideration the importance of the role of affect in consumer decision making and the theoretical contribution and practical implications of research in affect integration, there is a clear need for research to develop theory in affect integration particularly in a simultaneous presentation context.

A study of affect integration in a simultaneous presentation context can be conducted by investigating how consumers combine different types of affective images in the same print advertisement. This is the approach taken in the current research. The ability of print advertising to generate emotions is well documented. Pieters and de Klerk-Warmerdam (1996) demonstrated that print advertisements can concurrently generate unpleasant emotions as well as low and high intensity pleasant emotions. Geuens and De Pelsmacker (1998) also show that warm, erotic and humorous print advertisements have the ability to evoke strong emotional responses. A common technique to evoke emotions from print advertising is through the use of images. Studies on the processing of pictures have also shown that different types of pictures can generate affective responses that vary in valence and intensity (e.g., Bradley, Greenwald, Petry, and Lang 1992; Lang, Greenwald, Bradley, and Hamm 1993).

The research question to be investigated in this study is how consumers integrate affective stimuli when these are presented simultaneously. This is examined in conditions when the affective images in a print advertisement are of a) the same valence and differing intensity, b) differing valence and the same intensity and c) both differing valence and differing intensity. The impact of the frequency (number) of the affective stimuli is also investigated both in the context of univalence and oppositely valenced affect integration in a simultaneous presentation context. The goal of the current research is multi-fold: (1) to review previous research relevant to affect integration in a simultaneous presentation context; (2) to develop theory regarding affect integration under simultaneous presentation conditions; (3) to provide empirical examinations of propositions; and (4) to consider avenues for future research.

The next section reviews the literature that is relevant to the research question. The first research stream of relevance is the research investigating the impact of pictures in print advertising. The current research is conducted with print advertising stimuli and affect is manipulated through images in the advertisements. The review of the literature on the impact of pictures in print advertising will identify the gap in the advertising literature in terms of examining affective responses to images in print advertisements. The second research stream of significance is the research conducted on context effects of affective stimuli. This explores the impact of one affective stimulus on another when these are different conceptual entities. This literature provides theoretical insights into how affect is transferred between stimuli that are in close temporal proximity. The third research stream of interest is the research related to affect integration in a sequential presentation context. The findings from the sequential affect integration literature can provide theoretical directions for hypotheses development in simultaneous affect integration.

CHAPTER 2: LITERATURE REVIEW

The Impact of Images in Print Advertising

In advertising research, the use of images in print advertising has received considerable attention with respect to their impact on attitudes toward the advertisement (Mitchell 1986; Mitchell and Olson 1981; Singh et al. 2000), attitudes toward the brand (Miniard et al. 1991; Mitchell 1986; Mitchell and Olson 1981; Rossiter and Percy 1978; Rossiter and Percy 1980), recall (Childers and Houston 1984; Houston, Childers, and Heckler 1987), information processing strategies (Edell and Staelin 1983), imagery processing (Babin and Burns 1997; Unnava and Burnkrant 1991;) and generation of inferences (McQuarrie and Phillips 2005; Smith 1991,).

Rossiter and Percy (1978) developed a model on the impact of the visual elements in an advertisement. This model implies that visual elements in an advertisement can generate pleasant visual imagery in memory. This is known as "visual reinforcement" and affective learning and attitude towards the brand is impacted by the visual imagery generated. Rossiter and Percy (1980) demonstrated that both visual and verbal elements in an advertisement can impact attitudes toward the brand. The researchers conducted an experiment where four different types of advertisements were shown to participants. The advertisements differed in their visual and verbal content. The different types were: high visual-explicit verbal, high visual-implicit verbal, low visual-explicit verbal and low visual-implicit verbal. The results indicated that advertising with high visual and explicit verbal content was most persuasive in terms of impacting product attitudes and purchase intentions.

Mitchell and Olson (1981) demonstrated that visual elements (i.e., affect laden pictures) in an advertisement affect attitudes toward the advertisement, which impacts attitudes toward the brand and purchase intentions. This study examined the impact of both verbal and visual information on attitudes. Participants viewed four different advertisements. Of these, one of the advertisements contained only verbal descriptions of product attributes while the other three contained either a positive visual (two of the advertisements) or a neutral visual (the remaining advertisement). In terms of attitudes toward the brand, there was a significant difference between the two advertisements with positive images compared to the advertisements with the neutral image or no image. In terms of purchase intentions, there was a significant difference between the positive visual advertisements and the neutral visual advertisement. Mitchell and Olson (1981) also demonstrated that the impact on brand attitudes was mediated by attitudes toward the picture, indicating the impact of the visuals in an advertisement. Mitchell (1986) conducted a follow-up study to investigate the impact of pictures in advertising on attitudes toward the advertisement and attitudes toward the brand. Participants viewed advertisements for four different product categories with positive, negative or neutral images. The results indicated that the type of picture affected both attitudes toward the advertisement and attitudes toward the brand (positive images generated greater positive attitudes). Based on these studies, Mitchell (1986) proposed a “dual component” model which states that visuals elements in an advertisement affect attitudes toward a brand in two fundamentally different ways. First, the images in an advertisement help consumers to generate product attribute beliefs of the brand which subsequently impact attitudes toward the brand. Second, depending on the valence of the image, the affect laden pictures in an advertisement may have positive or negative impact on attitudes toward the advertisement which in turn will impact attitudes toward the brand.

Edell and Staelin (1983) conducted a study to demonstrate the effects of a dominant picture in a print advertisement. The findings showed that the information processing of print advertisements is impacted by the structure of the advertisement, in particular by the 'framing' of the dominant picture. Framing refers to whether there is consistency between the picture and verbal message. Participants viewed different print advertisements that varied in terms of structure (verbal, pictorial unframed and pictorial framed), content (objective, subjective and characterization) and product class (three different product classes were used). Unframed pictorial advertisements lead to less cognitive responses (counterarguments and support arguments) regarding important attributes of the brand. There was no difference in evaluative thoughts between framed pictorial advertisements and verbal advertisements. Unframed pictorial advertisements also lead to lower recall of brand information and advertising items. There was no difference in recall of brand information for framed pictorial advertisements and verbal advertisements. However, in terms of recall of advertising items, framed pictorial advertisements were superior. Finally, response times to brand statements were the longest for unframed pictorial advertisements, and no difference was observed between framed pictorial advertisements and verbal advertisements. The results demonstrate that higher level processing of print advertisements occurs when there is framing of the picture. A similar finding was reported by Childers and Houston (1984), who demonstrated that brand name is recalled more when there are images in an advertisement that integrate the brand and product class. Houston, Childers, and Heckler (1987) also found that recall of product attribute information was enhanced when it was depicted both verbally and visually as opposed to only verbally with an unrelated attribute being portrayed through the picture.

Imagery processing from pictures is investigated by Unnava and Burnkrant (1991). The researchers conducted an experiment to identify conditions when the imagery generated by pictures in advertising can increase recall of attribute information. Two factors were manipulated (the level of imagery generated by the verbal information in the advertisement and the presence of pictures in the advertisement). Results indicated that the addition of pictures in a print advertisement enhances recall for the attribute information only in conditions when the verbal copy of the advertisement is not imagery generating. In conditions where the verbal information is itself imagery generating, pictures related to the attribute do not enhance recall. Similar results were also found for delayed recall. Unnava and Burnkrant (1991) explained this effect by stating that pictures are stored in memory through "dual coding" (through both visual codes and verbal codes). However, similar to pictures, high imagery verbal information is also stored through dual codes, thus in such a condition the addition of pictures does not create any incremental memory benefits. Babin and Burns (1997) conducted a study to further examine the effect of imagery generated by the visual and verbal content of an advertisement on attitudes toward the advertisement and attitudes toward the brand. They compared the effect on attitudes from print advertisements with concrete pictures as opposed to print advertisements with abstract images or no images. The findings show that brand attitudes and attitudes toward the advertisement are significantly higher for print advertisement with concrete images compared to print advertisement with abstract images or no images (there was no difference between having abstract images or no images).

Miniard et al. (1991) identify the moderating role of involvement in the impact of pictures in advertisements. In conditions where the pictures in an advertisement are only peripheral cues (do not convey product specific information), an increase in involvement reduced the impact of pictures on product attitudes and purchase intentions. However, in conditions where the pictures in an advertisement are central cues (convey product specific information), an increase in involvement increased the impact of the picture on the same measures. These results are consistent with the Elaboration Likelihood Model (Petty, Cacioppo, and Schumann 1983) and illustrate that a picture in a print advertisement can either be a peripheral cue or a central part of the persuasive argument.

Smith (1991) investigated the impact of images in print advertising on consumer inference making. An experiment was conducted to examine the difference in inferences generated from advertisements with only images; only words; both words and images communicating the same attribute; and words and images communicating different attributes. Participants viewed print advertisements for six different types of products. Results indicated that both images and verbal content describing attributes lead to inferences regarding attributes that were not explicitly described. Furthermore, both positive and negative inferences generated from the image-only advertisement were less extreme than the inferences generated from the other types of advertisements. Inferences were primarily generated from the image in the advertisements when there was inconsistency between the image and the copy (each describing different attributes). McQuarrie and Phillips (2005) demonstrated that multiple positive inferences were spontaneously generated from metaphorical pictures in print advertisements. The number of positive inferences generated from metaphorical pictures was higher than from metaphorical verbal information.

Singh et al. (2000) considered the impact of having multiple images in an advertisement. The researchers examined print advertising where the ratio of copy-to-picture is low. Specifically, this study focused on advertisements which are primarily pictorial with the copy-picture ratio less than 50 percent. Participants in this study viewed either a primarily pictorial advertisement (an eight page advertisement for an automobile with multiple images) or a shorter version of the advertisement (the same advertisement was reduced to four pages by eliminating peripheral images and consolidating both verbal and pictorial information). Repetition was also manipulated in the experiment (single exposure versus two exposures). The results indicated that in terms of both evaluative attitudes and affective attitudes as well brand recall there was no difference between a single exposure to a longer pictorial advertisement compared to a single exposure to a shorter pictorial advertisement. Additionally, two exposures to the shorter version of the advertisement were more effective than one exposure to the longer version of the advertisement. The researchers state that reducing peripheral pictures that do not generate relevant imagery does not reduce the effectiveness of the advertisement.

Overall there has been significant research investigating the impact of pictures in print advertising, however few of these studies have actually focused on the affective responses to the pictures. These studies have primarily investigated the impact of images on cognitive based measures (e.g., evaluative attitudes toward the advertisement/brand, cognitive thoughts/inferences etc.) or on memory based measures (e.g., recall, recognition etc.). One exception was Singh et al. (2000), in which the researchers distinguished between affective components of attitude and evaluative components of attitude, and argued that the impact of pictures on the affective dimension should be examined independently (see also, Madden, Allen, and Twible 1988; Batra and Ray 1986 for a discussion on the need for such a distinction in measuring advertising effectiveness). However, Singh et al. (2000) only investigated advertisements with positive images. The review of the literature on the impact of images in print advertising identifies the lack of research on purely affective responses to pictures. Furthermore, none of the studies examined affect integration outcomes when there are multiple pictures that are negatively valenced or oppositely valenced in a print advertisement. The current research addresses both these issues.

Context Effects and Affect

Prior research has investigated the impact of previously experienced affective stimuli on subsequently experienced affective stimuli, when these two are conceptually different experiences. This phenomenon can be described as a *context effect*. For purposes of clarity, it is important to draw a distinction between research that has considered context effects involving affect and affect integration. Context effects refer to the impact of a preceding affective stimuli on a subsequent stimuli (e.g., a negatively valenced advertisement preceding a positively valenced advertisement), whereas affect integration refers to the integration of different types of affective stimuli within a particular event/message (e.g., positive and negative affective stimuli within the same advertisement).

Within an advertising framework, Aaker, Stayman, and Hagerty (1986) examined the impact of the sequence of affective advertisements on the final advertisement where the final advertisement is 'warm'. Warmth was defined as a "positive, mild, volatile emotion involving psychological arousal and precipitated by experiencing directly or vicariously a love, family, or friendship relationship." Participants in this study viewed a sequence of advertisements where the warm advertisements were preceded by either a warm or a type of non-warm advertisement (e.g., humorous, irritating, informative). The findings show that attitudes toward a warm advertisement were lower when the advertisement was preceded by an advertisement that elicited the same emotion, compared to the case where it was preceded by an advertisement that elicited a different emotion. There were similar effects on recall and purchase intentions. Vanden Abeele and MacLachlan (1994) also find support for the sequence effect. Participants in this study viewed 12 TV advertisements (three of each from the categories of warm, informative, humorous and irritating advertisements). Neutral filler ads were placed between each of the target commercials. Results indicate prior non-warm advertisements lead to higher levels of warmth felt for a warm advertisement compared to when the prior advertisement was itself warm.

Context effects have also been investigated in terms of how emotional responses to television programs impact affective response to and the effectiveness of advertisements shown within breaks of the program– a phenomenon known as "media context effects". Goldberg and Gorn (1987) conducted a study where participants viewed emotional and informational advertisements embedded in either a happy or sad program. The researchers find that compared to a sad TV program, a happy TV program leads to more positive affective responses to the advertisement and greater perceived commercial effectiveness of the advertisement. A main effect of program type was also found on the individual's felt mood during viewing the commercial. However, this was moderated by an interaction between program type and commercial type. The effects of the happy program on felt mood was found for emotional advertisements and not for informational advertisements. The researchers believe that such context effects occur due to the priming of mood congruent thoughts in memory. The researchers state that context effects may also occur due to the temporal association between the two stimuli (program and advertisement) which leads to “affect transfer” (Gorn 1982, Kroeber-Riel 1984). Singh and Churchill (1987) offer an “excitation transfer” explanation for such context effects. According to this theory, individuals misattribute the arousal generated by the program to the advertisement.

Schumann (1986) identified liking towards the program (as opposed to program induced feelings), as a context variable that had an impact on advertising effectiveness. Murry, Lastovicka, and Singh (1992) conducted a study to examine the impact of feelings towards the program and the liking of a program on advertisements embedded in the program. They distinguish between these two constructs and state that programs that elicit positive emotions (e.g., an upbeat comedy) and those that elicit negative emotions (e.g., a sad drama) may both be ‘liked’ by the viewers. In this study, participants viewed programs that differed in terms of the feelings generated (positive, negative or neutral). The also viewed more involving or less involving advertisements that were embedded in different positions of the pod. Program liking was measured separately and controlled in the experiment. Result demonstrated that program elicited feelings did not impact attitudes toward the advertisement or attitudes toward the brand; however program liking had an impact on these measures. The impact on attitudes toward the brand was mediated through attitudes toward the advertisement. The impact of liking of the program was higher when involvement with the advertisement was high and also when the advertisement was located in the first position in the pod. The researchers state that although feelings generated from the program may impact the liking of the program (programs that elicit positive feelings should be liked more), it is the liking of the program itself and not the valence of the elicited feelings that impact the evaluations of the embedded advertisements.

Coulter (1998) examined the impact of the affect generated by the program and the liking of the program on advertisements placed in the breaks of program in order to further clarify the earlier findings of Murry, Lastovicka, and Singh (1992). Participants in this study viewed positive or negative advertisements placed in a happy or sad program. Position of the advertisement in the pod was also manipulated. The results indicate that the impact of program induced affect on attitudes toward the advertisement is mediated by program liking. In other words, the emotional responses to the program affects program liking (the researchers found that both positive and negative emotions can enhance program liking), which in turn impacts attitudes toward the advertisement. This effect is stronger if the emotional content of the program and the advertising is similar and if the advertisement is located earlier in pod.

Aylesworth and MacKenzie (1998) investigated the impact of program induced mood on cognitive thoughts. Mood was defined as "a general, reactive, and acute feeling state". In this study participants were induced into a positive or negative mood through viewing twenty minutes of movie clips. Following viewing of the clips, the participants viewed the target advertisement and another filler advertisement. The findings demonstrate that compared to positive mood generating programs, negative mood generating programs generate less cognitive responses (both positive and negative) to the advertisement. Furthermore, the effect of both positive and negative advertisement related thoughts on attitudes toward the advertisement are less when the program induces a negative mood. These results are explained through the affect-as-information model (Clore, Schwarz, and Conway 1994; Clore et al. 2001; Schwarz 1990; Schwarz and Clore 1996), which states that negative mood states inform the individual about some problems in the environment which leads to central processing of the mood inducing stimuli (in this case, the program) and peripheral processing of other less important stimuli (in this case, the advertisement). The less systematic processing of the advertisement leads to a lower number of cognitive responses to the advertisement in the condition where the program induces a negative mood.

The relevance of context effects research for the current research is that it demonstrates that one affective stimulus has an impact on another. Across all these studies, there is a common theme of "affect transfer" between temporally proximate stimuli. This provides motivation and direction for affect integration research. Finding that the affect generated by a stimulus has an impact on affective responses to a separate stimulus is a strong indication that affective elements within the same event/message will also impact each other. However, this stream of research does not investigate affect integration per se. Stated differently, context effects focus on multiple discrete events that are related in terms of temporal proximity but are still separate conceptual entities, whereas affect integration looks at the integration of affective elements contained within a particular conceptual entity.

Affect Integration in a Sequential Presentation Context

Prior research in affect integration has primarily focused on the integration of affective stimuli within a sequential context. Research that has manipulated sequentially presented affective stimuli within the same affective experience has suggested that the overall reaction to the affective experience is a function of the response to a very select number of points and is largely unaffected by the total duration of the affective experience (a phenomenon known as "duration neglect"). In other words, affect integration in a sequential presentation context is primarily a non-compensatory mechanism, where all the affective stimuli are not weighted equally. Rather, research has demonstrated that when providing global evaluations of sequentially experienced affective stimuli, individuals give disproportionate weight to the peak affect experienced and the affect experienced during the last part of the sequence. This is known as the "peak-end rule" and has been substantiated across a number of studies in diverse research contexts using both positive and aversive stimuli.

Support for the peak-end rule and duration neglect is provided by Varey and Kahneman (1992). In this study, participants were provided with periodic discomfort ratings of another person experiencing an unpleasant episode (e.g., exposure to a loud drilling noise, standing in an uncomfortable position etc.). The episodes varied in length, affective intensity and trend of the affective experience. Participants were requested to provide overall affective evaluations of the person's experience. Results indicated that the trend of the discomfort was positively correlated with the global evaluations but the duration of the experience was not. Furthermore, the findings showed that the peak and end affective responses from the discomfort reports accounted for 94% of the variance observed in overall affective evaluations.

Fredrickson and Kahneman (1993) conducted two experiments where participants viewed positive and negative film clips that differed in duration and intensity and provided both real time and retrospective affective evaluations of the clips. The peak affect experienced and the affective experience at the end independently impacted overall evaluations for the positive film clips. Overall affective responses to the negative film clips was a joint combination of the peak level of affect experienced, as well as the affect encountered during the last portion of the film. For the positive film clips, the duration of the film had no effect on the retrospective evaluations. For the negative film clips, duration had negligible effects which were greatly reduced as time delay increased between viewing the film and providing retrospective evaluations. The findings of this study support both the peak-end rule and duration neglect.

Kahneman, Fredrickson, Schreiber, and Redelmeier (1993) also demonstrate the occurrence of the peak-end rule and duration neglect. In this study, participants were exposed to two separate affect generating experiences. In the first trial, participants immerse one hand in cold water (water temperature 14.1 C) for 60 seconds; in the second trial, participants immerse another hand in cold water (water temperature 14.1 C) for 60 seconds and then for a further 30 seconds during which period the temperature of the water rises (to 15.2 C) at a constant rate thus reducing the discomfort towards the end of the trial. When asked which of the two trials they preferred, participants indicate a clear preference for the second trial. Most participants reported that the longer trial which had a more positive ending caused overall less discomfort and was less difficult to cope with. This provides evidence that participants were more influenced by the affective state at the end and less by the duration of the experience.

The peak-end rule has been further substantiated in a study by Redelmeier and Kahneman (1996). The researchers investigated retrospective evaluations of painful medical procedures. Patients in a colonoscopy and a lithotripsy procedure were asked to rate their responses (in terms of discomfort) at one minute intervals beginning from the start of the procedure till the end. The duration of the procedure varied across the participants, and participants provided different on-line discomfort ratings. However, when asked to provide retrospective evaluations of the procedure, the peak intensity of discomfort and the discomfort felt during the last three minutes of the procedure accurately predicted the overall evaluation. Participants ignored the duration of the procedure, providing further support for duration neglect in affect integration.

In an advertising context, Baumgartner, Sujan, and Padgett (1997) find strong evidence for duration neglect and the influence of peak affective experience and the final affective experience on overall affective evaluations. Participants viewed thirty different advertisements (varying in length between thirty seconds and ninety seconds) and provided moment-to-moment emotional responses through a "feelings monitor". After viewing the advertisements, participants provided retrospective affective evaluations of the advertisements.

Results indicated that the overall affective response to the advertisement was closely correlated to the peak emotional experience and the final emotional experience generated by the advertisement. The correlation between duration of the advertisement and overall affective response was very weak. Furthermore, the rate of increase of positive affective response (positive linear trend of the ad) was also positively correlated with overall affective evaluation. This study provides support for the peak-end rule in a marketing context.

Ariely (1998) conducted two experiments that assessed participants retrospective evaluations of painful experiences. The first experiment investigated this in the context of pain induced by heat, while the second experiment examined evaluations of painful experiences induced by mechanical pressure. The results suggest that retrospective evaluations of pain are a function of the pain felt at the end, as well as the trend of pain experienced in the second half of the treatment. However, duration was found to have a small impact on retrospective evaluation for stimuli where intensity changed over time. Duration was found not to have an impact for retrospective evaluation when stimulus intensity was relatively constant over time.

Ariely and Carmon (2000) review the literature and state that evaluations of affective experiences are impacted by specific characteristics of the experience (end affect, peak affect and the trend of the affective experience). To investigate this phenomenon, the researchers asked patients in a bone marrow transplant unit of a hospital to provide their evaluation of the pain they were experiencing. Participants provided this response every hour over a day and at the end of the day they also gave retrospective evaluations of the pain they had experienced over the day. Results indicated that the pain experienced at the end and the trend of the pain was particularly predictive of the overall evaluation of the pain. Ariely and Carmon (2000) refer to the few features of an affective experience that dominate retrospective evaluations as "gestalt characteristics". Preference for an improving final trend has also been demonstrated in the domain of monetary gains and losses (Ross and Simonson, 1991) and in the choice of a sequence of weekends that differed in their levels of positiveness (Lowenstein and Prelec, 1993).

Collectively, the stream of research on affect integration in a sequential presentation context clearly argues against a purely compensatory mechanism of affect integration, whereby overall affective response is a simple mathematical average of all affective components experienced. These research findings suggest that sequentially experienced affective stimuli are integrated through a non-compensatory mechanism where certain stimuli within the affective experience are given greater weight. Most of the prior studies on affect integration have focused on the intensity of the affective experience at various points in time, holding valence (i.e. positive or negative) constant. A few studies have recently been conducted to investigate consumers' evaluation of affective experiences that include oppositely valenced affective stimuli (e.g., Williams and Aaker 2002, Olsen and Pracejus 2004, Lau-Gesk 2005).

Williams and Aaker (2002) examined the response to mixed affective persuasion appeals. Participants viewed a sad, happy or mixed emotional print advertisement where the emotional appeal was presented through verbal text.

Although the presentation was in print advertising, the emotional appeal was in the form of text which means that the appeal was likely to be processed in sequential order (left to right and top to bottom as text is normally read). In the happy condition, the appeal included a sequence of text that was primarily positive. In the sad condition, the appeal included a sequence of text that was primarily negative. In the mixed appeal condition, the appeal included a sequence of text that included both positive and negative sections. The researchers were primarily interested in identifying variables that impact the success of mixed emotional appeals. The results indicate that the key variable that mediates acceptance of mixed emotional appeals is the ability to accept duality. Participants with higher ability to accept duality preferred mixed emotional appeals equally to happy emotional appeals and more than sad emotional appeals. However, participants with lower ability to accept duality preferred happy emotional appeals over mixed emotional appeals or sad emotional appeals. The inclination to accept duality impacted the felt discomfort to mixed emotional appeals. Asian Americans and older adults (those with greater predisposition to accept duality) had lower levels of felt discomfort to mixed emotional appeals than Anglo Americans and younger adults (those less predisposed to accept duality).

Olsen and Pracejus (2004) conducted an experiment that examined the integration of positive and negative affective stimuli in a sequential context. This was examined in the context of a radio advertisement. Participants in this study listened to a radio advertisement in which affect was manipulated by the background music (positive only, negative only, negative-positive and positive-negative). The results indicated that in terms of positive affect, the negative-positive sequence was more positive than the positive only condition, while the positive-negative sequence was not more positive than the negative alone condition. These results support asymmetrical contrast. The theoretical justification for finding contrast effects in the negative-positive sequence is based on the motivational nature of affect. Olsen and Pracejus (2004) refer to the affect-as- information model (Clore, Schwarz, and Conway 1994; Clore et al. 2001; Schwarz 1990; Schwarz and Clore 1996), and state that "people who experience negative affect are prone to engage in behaviours that allow them to get out of this unpleasant psychological state". This indicates that experiencing the negative affective stimuli first will motivate individuals to have heightened expectation for the subsequently experienced positive affect, leading to greater overall positive affect experienced. In the positive-negative sequence there is no such heightened expectation resulting in the lack of contrast effects for this sequence. These results also dismiss a purely compensatory outcome resulting from the integration of sequentially experienced affective stimuli.

Lau-Gesk (2005) examined consumer evaluations of mixed affective sequential experiences. The researcher primarily focused on the evaluations of mixed affective experiences across conditions where the individual focuses on the source similarity or dissimilarity of the affective elements. Participants tasted jelly beans with different types of flavours (positive orange flavour, negative popcorn flavour and neutral cappuccino flavour) in different sequences. Source similarity was manipulated by instructing participants to focus on the similarity among the jelly beans (high source similarity) or the difference among the jelly beans (low source similarity). In the different sequences, temporal proximity of experience was manipulated (experiencing the mixed affective elements closer in time or further in time). Furthermore, the final trend of the experience was manipulated (improving trend of taste versus declining trend of taste). The findings from this study demonstrate that there is a difference in consumer preferences for temporal proximity and the final trend of mixed affective experiences depending on whether the affect was generated from the same source. When there is high source similarity, individuals prefer an improving final trend. However, when there is low source similarity, individuals prefer close temporal proximity between the affective stimuli and do not have a preference between improving or declining trends. Rather in conditions where differing sources generate diverse affective stimuli, individuals prefer to use the positive affect of one source to cope with negative affect of another source. A follow up study using aroma as the affective stimuli also showed that experts who could discern among different sources of aroma preferred temporal proximity between positive and negative affective stimuli when there was low source similarity. These results also indicate non-compensatory effects in evaluations of mixed affective experiences when they are from the same source.

One of the primary deviations from a purely compensatory response in these studies, however, is strictly defined by sequence. That is, the special role played by response to stimuli at the end of a series has no analogue in simultaneous presentation. Given this, it seems clear that at least with respect to the role of the end, simultaneous presentation of affective stimuli will necessarily differ from sequential presentation. Furthermore, unlike sequential presentation where there is a trend of affective experience, there is no such trend in simultaneous presentation as the affective stimuli are presented together. The contrast effect observed during sequential presentation of oppositely valenced stimuli should also not be observed during simultaneous presentation as the affective stimuli are presented together and none of the stimuli precede another.

The research presented here differs from the extant literature in sequential affect integration in two key respects. First, all previous research has possessed a temporal component in terms of affective stimulus presentation, and has thus considered integration in a *sequential*, not a *simultaneous*, context. Hence, previous research does not speak to what integration mechanism(s) will be observed when the affective stimuli are presented at once. Another limitation of previous research conducted to date is that, with few exceptions, prior research manipulating the affect in a single event/message has primarily focused on the integration of stimuli that are of common valence (i.e., it has focused on the integration of positive stimuli or negative stimuli, but not both). Consequently, an additional contribution of the research presented here is to examine the impact of combining stimuli of opposite valence in a simultaneous presentation context.

CHAPTER 3: THEORY DEVELOPMENT

Definition of Simultaneous Presentation

Prior to discussing issues of simultaneous presentation, it is important to establish what is meant by the term. First, the term simultaneous presentation speaks to the order with which items are *presented* (e.g., two pictures are physically presented at the same time) and therefore does not, in and of itself, make any commentary on the sequence of *processing*. It is recognized that given mental processing limitations, people are constrained to process the information in some physical order. Nonetheless, it can be argued that, especially for pictorial stimuli in an advertising context, the simultaneous presentation enables an incredibly rapid and repeated juxtaposition of stimuli and results in a situation that might functionally be considered simultaneous. Without question, this is very different from a sequential presentation that would occur in a broadcast format (i.e., the first stimulus occurs for a certain duration and is removed prior to the occurrence of the second).

The mechanism of affect integration in a sequential presentation context is described through the peak-end rule. When a simultaneous presentation condition is considered, the shortcomings of previous research underscoring the importance of the end stimulus become clear. Simply put, in a simultaneous format there is no clear end stimulus, as all the affect generating stimuli are presented together. Similarly, in cases where oppositely valenced stimuli are present, it is not clear what the peak stimulus would be. That is, it is not clear whether the peak would be with respect to the most positive stimulus, the most negative stimulus or the highest absolute affect observed. Clearly, theory development is required to deal with each of these issues, as the peak-end rule is conceptually inadequate to describe the mechanism of affect integration in a simultaneous presentation context.

Affect Integration Under Simultaneous Presentation, Manipulating Intensity Holding Valence Constant

Let us take the simple case where there are multiple stimuli in a message that are of a common valence (i.e., all negative or all positive, but not a mixture of the two). As noted earlier, while it may be possible to identify the peak, the end point is not evident. Building on extant literature based on sequential affect integration, it is believed that the peak will still have a considerable influence and, in the absence of any end information, that it will have the predominant impact on the overall affect experienced. As such, it is anticipated that the global affect generated is a function of the peak value alone. In other words, there will be no additive effect when combining different levels of univalence affective stimuli, rather the overall affective response will be equal to the response generated by the peak affective stimuli. At this point in time, some additional consideration must be given to the scale used for measuring affect.

Positive affect is, under a variety of circumstances, negatively correlated with negative affective response. It is also intuitively appealing to imagine that negative affect is the perfect inverse of positive affect. Empirically, however, there is evidence to suggest that positive and negative affect are independent constructs that are often only weakly negatively correlated (see e.g., Watson and

Tellegen 1985, Watson, Wiese, Vaidya, and Tellegen1999). Given that it is possible, under certain conditions, to shift positive and negative affect independently (within some limited range), the two constructs are explored separately in this study. When investigating the integration of only univalence affective images the impact of the affective images on the corresponding affective dimension is relevant. In other words, when exploring the integration of multiple positive (negative) affective images, the impact on the positive (negative) affect scale is of primary interest. To the extent that the negative correlation between positive and negative affect is not perfect, the corresponding impact on the negative (positive) affect scale may not be the exact opposite. In experiments where the integration of both positive and negative images is examined, the impact on both the affective scales is considered.

Given the proposition above and consideration of scale specific issues, the following hypotheses may be provided:

H1a: In a simultaneous presentation context, the overall positive affect generated when combining stimuli of positive valence is a function of the peak positive stimulus.

H1b: In a simultaneous presentation context, the overall negative affect generated when combining stimuli of negative valence is a function of the peak negative stimulus.

Affect Integration Under Simultaneous Presentation, Manipulating Valence Holding Intensity Constant

Under simultaneous presentation conditions where stimuli of only one affective valence are present, it was noted that although the end was gone the peak remained. In a case where both negatively and positively valenced affective stimuli are present, it is no longer clear what the peak is. The peak may refer to the peak positive stimulus or the peak negative stimulus. As such, both touchstones (the end and the peak) of prior affect integration literature are removed from the equation. In such a scenario, a number of unique possibilities emerge, including a peak-positive mechanism, a peak-negative mechanism or a compensatory mechanism.

One possibility is that a peak-positive effect will be observed (i.e., the overall response is only a function of the positive affective component). Such an outcome would be consistent with mood-maintenance research by Wegener and Petty (1994) as well as by Wegener, Petty, and Smith (1995). This literature suggests that individuals will take steps to mitigate negative/sustain positive affect. Accordingly, it may be possible that people will choose to process the positive affective information and not process the negative affective information in an effort to achieve this end. Such a process would yield a peak-positive effect, whereby the overall response would be a function of only the most positive stimulus present.

A peak-negative mechanism is alluded to by another stream of research in the affect literature. Research in line with current thinking on affect-as-information (Clore, Schwarz, and Conway 1994; Clore et al. 2001; Schwarz 1990; Schwarz and Clore 1996), would suggest that negative affect alerts individuals to something potentially dangerous in their environment. As such, it is of particular importance from an evolutionary perspective and is therefore given particular salience. In line with this, it is possible that the negative affective information will dominate attention and that a peak-negative mechanism will be observed.

A unique possibility is that a compensatory process will be observed, where the overall response will be a function of both the positive and the negative affective stimuli. This represents a divergence from previous research regarding affect integration that, to date, has suggested that non-compensatory processes operate when affective stimuli are combined. However, under sequential presentation conditions, there is evidence (Olsen and Pracejus 2004) to suggest that when oppositely valenced stimuli are present both negative and positive affective stimuli are given consideration. Specifically, Olsen and Pracejus (2004) found a contrast effect, whereby preceding a positive stimuli with a negative stimulus can lead to greater levels of positive affect than presenting the positive stimulus alone. Preceding a negative stimulus with a positive stimulus, however, does not have the same effect. They argue that this lends support to the view that affect is motivational in nature (i.e., the sequential affect integration mechanism leads to mood repair in the negative-positive sequence). The mood repair mechanism observed in the negative-positive sequence is a function of the mode of presentation. Under a sequential presentation condition, when a negative stimulus precedes a positive stimulus, a mood repair mechanism suggests that the negative stimulus serves to heighten awareness for incoming stimuli, resulting in increased attention being given to the positive affective information. Conversely, the opposite sequence does not result in a contrast (i.e., the positive stimulus does not signal that something is wrong and therefore does not heighten awareness for incoming stimuli).

Should the explanation above be correct, then the same type of affective juxtapositions, without temporal sequence, should result in very specific and very different results from the sequential case. Specifically, a simultaneous presentation format would lead to the removal of an explicit sequence (i.e., greatly reducing, if not eliminating, the presence of a heightened awareness for incoming stimuli) and consequently would lead to the negation of the contrast effect. On the other hand, if the contrast effect observed in sequential affect integration is not due to the motivational nature of affect rather is due to some form of perceptual contrast (comparing negative and positive stimuli) then such an effect would also be observed in simultaneous affect integration as both types of stimuli are present. Indeed, if perceptual contrast is operating, it should actually be greater under simultaneous presentation conditions as the oppositely valenced affective stimuli are presented together and are thus easily comparable.

In short, work by Olsen and Pracejus (2004) suggests that neither a peak positive nor a peak negative mechanism dominates when oppositely valenced stimuli are jointly presented. If, therefore, both positive and negative stimuli have an impact and the removal of temporal sequence mitigates contrast, then a compensatory mechanism should be observed. As both negative and positive stimuli have an impact, the compensatory mechanism should impact both the positive and negative affect scale.

Williams and Aaker (2002) examined the response to verbally generated mixed affective stimuli in a print advertisement. Although the primary dependant variables of interest included attitude towards the advertisement and felt discomfort, they also examined felt emotional response to the advertisement. In two experiments, they had separate conditions of happy, sad and mixed emotional appeals. In the first experiment, they found that the mixed emotional appeal generated greater happy feelings than the sad emotional appeal and less happy feelings than the happy emotional appeal. This indicates a compensatory effect when utilizing mixed emotional appeals. The mixed emotional appeal created greater sad feelings than the happy emotional appeal, however it did not generate less sad feelings than the sad emotional appeal (this indicates lack of a compensatory outcome). In the second experiment, they found that the mixed emotional appeal generated greater sad feelings than the happy emotional appeal and less sad feelings than the sad emotional appeal. This also supports a compensatory model. The mixed emotional appeal evoked marginally less happy feelings than the happy emotional appeal, however it did not generate more happy feelings than the sad emotional appeal. The fact that a compensatory outcome in terms of emotional response was observed in some conditions for verbally generated mixed affective stimuli in print advertising provides additional support to the theory that a compensatory model may be observed for visually presented affective stimuli of opposite valence in a simultaneous presentation context (although this is not exactly similar to the simultaneous presentation of visual images, as text is generally processed in a predetermined sequence).

Other research also suggests that the integration of positive and negative stimuli will lead to a compensatory outcome. Linville and Fischer (1991) demonstrated that individuals prefer to combine positive and negative events rather than segregate them. They report that individuals prefer such combinations as the positive event can be used as a buffer for the negative effect. The preference for experiencing positive and negative events in the same time frame as opposed to different time frames has also been reported in the marketing literature (Thaler 1985). Considering that positive and negative stimuli can mitigate each other also leads to a compensatory outcome. The following hypothesis is proposed:

H2: In a simultaneous presentation context, when oppositely valenced stimuli of the same intensity are combined, a compensatory mechanism will be used to arrive at the overall positive and overall negative affect experienced.

Affect Integration Under Simultaneous Presentation, Manipulating Both Valence and Intensity

Most of the previous research in affect integration has mainly focused on the integration of commonly valenced affective stimuli differing in intensity. Olsen and Pracejus (2004) and Lau-Gesk (2005) have investigated the integration of oppositely valenced affective stimuli within a sequential experience context. Williams and Aaker (2002) also examined the impact of mixed emotional appeals. However, the intensity of the stimuli was not manipulated in these studies. Prior research has not examined the integration of affective stimuli where the stimuli are oppositely valenced and have different levels of intensity (i.e. high positive integrated with low negative and vice versa). A complete understanding of affect integration in a simultaneous presentation context requires the investigation of this type of scenario where both valence and intensity are manipulated and combined. In such a scenario, a number of outcomes are possible.

A purely non-compensatory mechanism may be observed where the peak intensity of the stimuli dominates. In other words, the peak effect may be observed with a high positive and low negative combination having the same affective response as the high positive stimulus alone or a high negative and low positive combination having the same affective response as the high negative stimulus alone. The first outcome would be in line with the mood maintenance literature (Wegener and Petty 1994; Wegener, Petty and Smith 1995) and the second outcome would be in line with the affect-as-information literature (Clore, Schwarz, and Conway 1994; Clore et al. 2001; Schwarz 1990; Schwarz and Clore 1996).

However, taking into consideration the justification provided for the proposed compensatory mechanism for simultaneous affect integration when combining oppositely valenced affective stimuli of equal intensity, there is reason to believe that a similar compensatory mechanism will operate in the case of simultaneous affect integration when combining oppositely valenced affective stimuli of differing intensity. Olsen and Pracejus (2004) find support for the impact of both positive and negative stimuli when they are presented together sequentially, hence there should also be an impact of both stimuli when they are presented together simultaneously. However, in this case, as the presentation occurs simultaneously and not sequentially, no contrast effects are expected. In this condition, a compensatory mechanism is expected that takes into consideration both the positive and negative affective stimuli. For example, the combination of a high negative stimulus and a low positive stimulus should be less negative and more positive than the high negative stimulus alone and less positive and more negative than the low positive stimulus alone.

Linville and Fischer (1991) reported that individuals prefer to combine a large gain with a small loss (a mixed gain) on the same day as opposed to experiencing them on separate days. Similarly, they also prefer to combine a large loss with a small gain (a mixed loss) on the same day rather than on separate days. These preferences for mixed gains/losses were tested across social, academic and financial domains. Based on thoughts provided by the participants, the researchers reported that the preference for mixed gains was due to the "attentional buffer" provided by the positive event that reduced the impact of the negative event. The preference for mixed losses was due to the "emotional buffer" provided by the positive event that allowed individuals to cope with the negative event. Thus, the coping literature also provides support for a compensatory outcome when combining positive and negative affective stimuli in a simultaneous presentation context.

In line with these explanations, the following hypothesis is proposed:

H3: In a simultaneous presentation context, when oppositely valenced stimuli of differing intensity are combined, a compensatory mechanism will be used to arrive at the overall positive and overall negative affect experienced.

The Impact of the Frequency of Affective Stimuli on Affect Integration in a Simultaneous Presentation Context

Prior studies of affect integration in a sequential context have found evidence for duration neglect (e.g., Fredrickson and Kahneman 1993) – in other words, the total duration of an affective experience does not drive overall affective response rather it is some key moments of the experience (the peak-end rule) that are given consideration. In a simultaneous presentation context where all affective stimuli are presented together, there is no explicit control for the duration of attention that individuals will pay to each affective stimulus. However, similar to duration neglect within a sequential presentation context, there may be an issue of "frequency neglect" in relation to simultaneous presentation. In this context, frequency refers to the number of times a particular type of affective stimuli is present in the affective experience (i.e. the number of times positive stimuli is present or the number of times negative stimuli is present). In terms of a simultaneous presentation, frequency neglect refers to conditions when there is a disregard for the frequency of a particular type of stimuli; rather attention is paid to the valence and intensity of the affective stimuli. Thus, it is interesting to consider the impact of frequency in a simultaneous presentation context, particularly considering the integration of both commonly and oppositely valenced stimuli.

In the case of the simultaneous integration of univalence affective stimuli, it is predicted that there will be a non-compensatory mechanism operating - either a peak positive or peak negative effect operating depending on the valence of the stimuli being integrated. For example, the integration of a high positive and a low positive stimulus will generate the same positive affect as a high positive stimulus alone. Similarly, the integration of multiple positive stimuli of the same intensity will generate the same positive affect as one positive stimuli of equal intensity. This would provide evidence of frequency neglect in univalence affect integration in a simultaneous presentation context. Frequency neglect should also be observed for the simultaneous integration of only negatively valenced affective stimuli. In this case, the integration of a high negative and a low negative stimulus will generate the same negative affect as a high negative stimulus alone. Similarly, the integration of multiple negative stimuli of the same intensity will generate the same negative affect as one negative stimuli of equal intensity. This leads to the following hypotheses regarding the impact of the frequency of affective stimuli in univalence affect integration in a simultaneous presentation context. As in Hypothesis 1a and Hypothesis 1b, when integrating only positive stimuli the impact on the positive affect scale is of interest and when integrating only negative stimuli the impact on the negative affect scale is of interest.

H4a: In a simultaneous presentation context, when only positively valenced affective stimuli (of the same intensity) are combined, increasing the frequency of positively valenced stimuli will not increase the overall positiveness of the affect experienced.

H4b: In a simultaneous presentation context, when only negatively valenced affective stimuli (of the same intensity) are combined, increasing the frequency of negatively valenced stimuli will not increase the overall negativeness of the affect experienced.

However, in the case of the simultaneous integration of oppositely valenced affective stimuli, "frequency effects" should be observed. According to Hypothesis 2 and Hypothesis 3, when there are both positive and negative affective stimuli, individuals use a compensatory mechanism to arrive at overall affect experienced. As a compensatory mechanism is operating, where all positive and negative stimuli are taken into consideration, increasing the number of positive or negative stimuli should influence the overall affect experienced in favour of the type of the stimuli with the higher frequency. For example, the combination of three positive stimuli and one negative stimulus should be more positive and less negative than the combination of one positive stimulus and one negative stimulus, particularly in the case where all the stimuli are of the same intensity.

This is also supported by prior research in the coping literature which states that individuals use positive events to cope with negative events (e.g., Linville and Fischer 1991). This implies that having more positive elements allow for a greater number of sources of positive affect to buffer the negative affect, thus decreasing overall negativeness and increasing overall positiveness. The opposite is true in the condition when there is an increase in the number of negative elements. The impact of frequency in affect integration of oppositely valenced affective stimuli in a simultaneous presentation context is proposed through the following hypotheses:

H5a: In a simultaneous presentation context, when oppositely valenced stimuli (of the same intensity) are combined, increasing the frequency of positively valenced stimuli will increase the overall positiveness and decrease the overall negativeness of the affect experienced.

H5b: In a simultaneous presentation context, when oppositely valenced stimuli (of the same intensity) are combined, increasing the frequency of negatively valenced stimuli will increase the overall negativeness and decrease the overall positiveness of the affect experienced.

The hypotheses proposed above imply that, in a simultaneous presentation context, the effects of the frequency of affective stimuli on univalence affect integration and oppositely valenced affect integration are different. For univalence affect integration there is frequency neglect, however for oppositely valenced affect integration there are frequency effects. This is due to the fact that a peak mechanism drives univalence affect integration, while a compensatory mechanism is in place for oppositely valenced affect integration.

CHAPETR 4: EXPERIMENTAL STUDIES

Overview of Experiments

Five experiments are conducted to investigate issues that emerge from theory development. The context for examining the proposed hypotheses is print advertising. Print advertising is a real life context where individuals are exposed to differing types of affective stimuli simultaneously. Images controlling for valence and intensity of affective response are presented either alone or in juxtaposition with another image or images (whereby affective stimuli are presented simultaneously) in a print advertisement. The studies are conducted in a lab environment using student participants.

The first experiment holds valence constant while manipulating the intensity of the stimuli in a simultaneous presentation context. In other words, it investigates the combination of differing levels of positive stimuli in the same advertisement and differing levels of negative stimuli in the same advertisement. As such, it is intended to examine whether the peak mechanism observed for univalence stimuli under sequential presentation conditions in the extant literature also holds when the stimuli are presented simultaneously. The second experiment examines the simultaneous juxtaposition of oppositely valenced stimuli of the same intensity. It examines the integration process when moderately positive and moderately negative affective stimuli are combined in the same advertisement. This experiment is conducted to determine whether a compensatory mechanism holds, or whether this integration is better represented by mechanisms of a peak-positive or peak-negative nature. The third experiment is conducted to investigate the simultaneous presentation of affective stimuli differing in both valence and intensity. It examines the integration process when positive and negative affective stimuli of differing intensity (e.g., high positive and low negative) are combined in the same advertisement. The experiment seeks to determine whether such a presentation results in the proposed compensatory mechanism or whether non-compensatory mechanisms better explain the integration process. The fourth experiment explores frequency neglect in the integration of univalence affective stimuli which are presented simultaneously. In others words, the study is conducted to investigate whether having a higher number of one type (in terms of valence) of affective stimuli impacts the integration process when only positive or only negative affective stimuli of the same intensity are combined. The fifth experiment explores the issue of frequency effects in the integration of oppositely valenced affective stimuli which are presented simultaneously. In others words, the study is conducted to investigate whether having a higher number of one type (in terms of valence) of affective stimuli impacts the integration process when both positive and negative affective stimuli of the same intensity are combined.

Taken together, these five experiments endeavour to provide an in-depth look at the affect integration process within a simultaneous presentation context. The participants, design, stimuli, procedure, measures and results for these experiments are described in the following sections. In order to select the affect generating images to be used in the print advertisements, a pre-test was conducted before the main experiments commenced. The pre-test is briefly described next.

Pre-Test

All five experiments manipulate affect via the image(s) used in a print advertisement for a hypothetical camera. In order to select appropriate images that differed in terms of valence and intensity a pre-test was conducted. First, 90 different images were selected to be used in the pre-test from which the final subset of images to be used in the main experiments would be selected. These images were believed to vary in terms of the valence and the intensity of affect aroused. Of note, all images were taken from professional photography books and were scanned into an electronic format at high resolution (1200 dpi).

Images were examined in terms of affective response. A total of 46 individuals drawn from the same subject pool as participants in the final studies provided this assessment on an 11 point scale, anchored “extremely negative (-5)” and “extremely positive (5)”. A neutral point of zero was also included. Images were assembled in booklets with a single image presented on a given sheet of paper. Images were randomly ordered in the booklet. Participants viewed each image and provide their response. The viewing of the images was self paced.

Results for the final images used in these studies are presented in Table 1. A total of 30 images were finally selected, as they fell into distinctive groups in terms of valence and intensity. These images were classified into six groups: high positive, moderate positive, low positive, high negative, moderate negative and low negative. There were five images within each category. The images in each category significantly differed in terms of affective response from the images in the other categories.

TABLE 1

Pre-testing of Stimuli: Affective Response to Images

		Affective Response*	
Category	Verbal Description of Image	Mean	SD
High Positive	1. Man holding baby.	3.83	1.02
	2. Girl petting dog.	3.61	1.02
	3. Child with large smile.	3.78	1.21
	4. Woman hugging man.	3.65	1.30
	5. Soccer players celebrating.	3.65	1.20
	Average	3.70	
Moderate Positive	1. Children leaving school.	2.54	1.46
	2. Man with pigeons.	2.37	1.58
	3. Man and woman at party.	2.41	1.33
	4. Woman dancing.	2.37	1.39
	5. Woman holding champagne glass.	2.50	1.39
	Average	2.44	
Low Positive	1. Woman on bike.	1.52	1.33
	2. Young boy flexing muscle.	1.57	1.41
	3. Female athlete with sunglasses.	1.24	1.34
	4. Family with party hats on.	1.76	2.18
	5. Woman on park bench with dog.	1.80	1.34
	Average	1.58	
Low Negative	1. Young boy being scolded.	-1.26	1.87
	2. Young woman looking lonely.	-1.70	1.44
	3. Protest rally.	-1.72	2.10
	4. Man holding cello looking sad.	-1.61	1.71
	5. Man with arms crossed.	-1.30	1.46
	Average	-1.52	
Moderate Negative	1. Man pulling cart.	-2.89	1.52
	2. Man leaning against wall.	-2.17	1.34
	3. Little girl looking sad.	-2.67	1.56
	4. Man holding head.	-2.83	1.12
	5. Child crying during a game.	-2.41	1.69
	Average	-2.60	
High Negative	1. Man being kicked.	-4.04	1.03
	2. Police officer with dog.	-3.72	2.01
	3. Man in prison cell.	-3.96	1.11
	4. Picture of urban decay.	-3.78	1.01
	5. Army personnel.	-4.00	1.07
	Average	-3.90	

*Affect is based on an eleven-point scale anchored, "extremely negative (-5)" and "extremely positive (5)", with a neutral point of zero.

Experiment 1

Participants

A total of 220 students in an introductory marketing course participated for research credit.

Design

The purpose of this study was to investigate the integration of univalence affective stimuli in a simultaneous presentation context. Although stimuli of opposite valence were never combined in the same experimental condition, both positively and negatively valenced stimuli were considered in different conditions. For positively valenced affective stimuli, the following between-subject conditions were employed: High-Positive Single, Low-Positive Single and Mixed-Positive (i.e., High-Positive jointly presented with Low-Positive). For the negative affect conditions, a parallel set of stimuli were employed: High-Negative Single, Low-Negative Single and Mixed-Negative. There were 30 participants in each of the following conditions: High-Positive Single, Low-Positive Single, High-Negative Single and Low-Negative Single. There were 50 participants in each of the two Mixed conditions.

Advertising Stimuli

In order to present a context where the simultaneous presentation of different types of affective stimuli seemed credible, an advertisement for a camera noting the use of that particular brand of camera for photo-journalistic purposes was created. The text in the copy was intended to provide sufficient justification for interest in the ad and the brand, without presenting an abundance of strong copy points. Specifically, the text read, "For over 75 years, [Brand Name] has been the leading choice of photo-journalists. The images captured are not always pretty, but they are always of high quality. [Brand Name] builds a camera with a reputation for being reliable even under the most difficult conditions."

Each advertisement was 8.5" X 11", black and white, printed on plain white paper. The image(s) were presented in the top portion of the advertisement, with the text and the brand name of the camera presented in the lower portion. Each image was approximately 3.5" X 3.5". A layout of the advertisement when one image was present is given in Appendix B and a layout of the advertisement when two images were present is given in Appendix C. To reduce the likelihood that any results observed were due to something idiosyncratic about a particular image, for each condition multiple advertisements were created using a variety of images (five) to represent a given valence/intensity category (e.g., High-Positive). This is in line with previous consumer research that employs multiple stimuli within a given condition to increase generalizability (see e.g., Mantel and Kellaris 2003). For conditions where only one image is present, five different versions of the advertisement were created. For the Mixed conditions where two images are present, all possible combinations (i.e., 25 for each of the Mixed conditions) were employed. For the Mixed conditions, the position of the high and low intensity image on the page was counterbalanced (i.e., in the Mixed Positive condition the high positive image was on the left for half the participants and the low positive image was on the left for the remaining half of the participants). As such it is possible to investigate whether the position on the page has an impact.

Procedure

The experiment was conducted in a lab setting, with approximately 15 people per session, randomly assigned to condition. Participants were seated in divided cubicles so that they did not have visual access to other individual's stimuli. Participants were told that they would see a print advertisement for thirty seconds and that following this they would be asked questions about the advertisement. Following the preliminary instructions, the booklet containing the experimental advertisement was distributed with instructions not to commence until directed to do so. Once all participants had received the booklet, individuals were instructed to turn the opaque front cover over and view the advertisement for thirty seconds. In order to avoid biases that may have occurred if the advertisement was embedded amongst others, only the experimental advertisement was shown (see Aylesworth and MacKenzie 1998, for a discussion of presenting advertisements nude versus in context). After viewing the advertisement, the participants completed a questionnaire. The questionnaire is attached in Appendix A.

Measurement of Affect

Affect was assessed using the scale employed by Pham et al. (2001). The scale consisted of ten items anchored "1 (not at all)" and "7 (very strongly)". A factor analysis employing oblique rotation was conducted with the data from all the 220 participants across the ten items of the affect scale. The eigenvalues are provided in Table 2. The *eigenvalue greater than one* criterion indicates that the items loaded on two separate factors. The first factor consisted of items related to negative affect and the second factor consisted of items related to positive affect.

TABLE 2

Eigenvalues and Variance Explained (Experiment 1)

Component	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
1	5.99	59.90	59.90
2	1.73	17.26	77.17
3	0.53	5.36	82.52
4	0.37	3.70	86.22
5	0.33	3.30	89.52
6	0.29	2.89	92.41
7	0.26	2.62	95.03
8	0.20	2.03	97.06
9	0.19	1.88	98.95
10	0.11	1.06	100.00

The factor loadings for the items on the two factors are indicated in the factor pattern matrix in Table 3. The six items that were related to negative affect were: "I had unpleasant feelings viewing the ad"; "I was disgusted by the ad"; "I was fearful viewing the ad"; "The ad made me feel bad"; "The ad made me feel angry" and "The ad made me feel sad." The four items that were related to positive affect were: "The ad made me feel happy"; "The ad made me feel good"; "The ad made me feel joyful" and "I had pleasant feelings viewing the ad." The correlation between the two factors was -0.50.

TABLE 3

Factor Pattern Matrix for Affect Scale Items (Experiment 1)

Item	Component 1	Component 2
Unpleasant	0.74	-0.21
Happy	-0.06	0.89
Disgusted	0.82	-0.04
Good	-0.04	0.93
Fearful	0.85	0.17
Bad	0.85	-0.11
Angry	0.84	-0.03
Joyful	-0.07	0.96
Pleasant	-0.05	0.87
Sad	0.84	-0.02

Note. Items loading on the same factor are underlined.

A separate factor analysis including only the positive affect items indicated that these items loaded heavily on a single construct (eigenvalue = 3.41; 85.2% of the variance accounted for; minimum factor loading = 0.89; Cronbach's alpha = 0.94). Another factor analysis including only the negative affect items indicated that these items also loaded on a single construct (eigenvalue = 4.26; 71.0% of the variance accounted for; minimum factor loading = 0.74; Cronbach's alpha = 0.92). Overall scores for each construct were determined by computing the average responses to the items defining positive affect and negative affect.

Results

For the positively valenced stimuli, a MANOVA with positive affect and negative affect as the dependent variables revealed a significant difference across the groups on one or both of the dependant variables, Wilks $\lambda = 0.92$, $F(4, 212) = 2.40$, $p = .05$. A separate ANOVA was conducted for both positive affect and negative affect. For the positively valenced stimuli, the results of the ANOVA indicated that in terms of positive affect, there was a significant difference across the groups, $F(2, 107) = 3.59$, $p < .05$. The Levene test statistic was 3.18 with 2 and 107 degrees of freedom, $p < .05$. This indicates that the variances across the groups were not equal. A more robust test that considers the heterogeneity of variances (the Welch test) was conducted to test the equality of means across the groups. The Welch test statistic was 4.05 with 2 and 61.02 degrees of freedom, $p < .05$. This indicates that there was a difference across the positively valenced groups on the positive affect scale. For the positively valenced stimuli, the results of the ANOVA indicated that in terms of negative affect, there was no significant difference across the groups, $F(2, 107) = 2.34$, *ns*.

For the negatively valenced stimuli, a MANOVA with positive affect and negative affect as the dependent variables revealed a significant difference across the groups on one or more of the dependent variables Wilks $\lambda = 0.81$, $F(4, 212) = 5.81$, $p < .001$. A separate ANOVA was conducted for both positive affect and negative affect. For the negatively valenced stimuli, the results of the ANOVA indicated that in terms of positive affect, there was a significant difference across the groups, $F(2, 107) = 4.22$, $p < .05$. The Levene test statistic was 2.79 with 2 and 107 degrees, *ns*. This indicates that the variances across the groups are not different and the results of the ANOVA are acceptable. For the negatively valenced stimuli, the results of the ANOVA indicated that in terms of negative affect, there was a significant difference across the groups, F (2, 107) = 9.83, $p < .001$. The Levene test statistic was 0.58 with 2 and 107 degrees of freedom, *ns*. This indicates that the variances across the groups were not different and the results of the ANOVA are acceptable.

Mean results by condition and type of affect are presented in Table 4. Further analyses of the difference of means between groups are reported below for both positive and negative affect. For purposes of completeness all comparisons are presented for both types of affect scales. However, in line with Hypothesis 1a and Hypothesis 1b the positive affect scale is relevant for examining the integration of positive stimuli and the negative affect scale is relevant for negative stimuli.

Positive Affect Scale. For the positively valenced stimuli, the pattern of results on this dimension is consistent with a peak mechanism. Specifically, the High-Positive and Low-Positive conditions were found to differ, $t(58) = 2.05$, $p < .05$, indicating that the stimuli were capable of evoking different levels of affect within the advertising context in which they were placed. While the Low-Positive condition differed from the Mixed Positive condition, $t(78) = 2.71$, $p < .01$, the High-Positive condition did not, $t(78) = 0.15$, *ns*. When a strong positive is present, it matters little whether or not a weak positive is also present. These results support a positive peak effect and Hypothesis 1a.

For negatively valenced stimuli, High-Negative and Low-Negative conditions significantly differed, $t(58) = 2.65$, $p < .01$, as did the Low-Negative and Mixed Negative conditions $t(78) = 2.30$, $p < .05$. However, High-Negative and Mixed Negative conditions, $t(78) = 0.48$, *ns*, were found not to differ at conventionally significant levels. Recall that the logic presented required the peak effect to be seen on the positive scale for the positive stimuli and the negative scale for the negative stimuli, it did not require effects to be witnessed on the positive scale for the negative stimuli or the negative scale for the positive stimuli. To find that the peak effect is seen on the positive scale for negative stimuli is an interesting side-note; however, it does not detract from the key findings related to the hypotheses. The position of the image on the page did not have a significant impact for either Mixed-Positive, $t(48) = 0.18$, *ns*, or Mixed-Negative, $t(48) = 0.59$, *ns*, conditions.

Negative Affect Scale. For the positively valenced stimuli, a difference is observed between the Low-Positive and Mixed Positive condition, $t(78) = 2.10$, $p < .05$. However, no significant differences are observed between the Low-Positive and High-Positive conditions, $t(58) = 1.12$, *ns*, or between the High-Positive and Mixed Positive conditions $t(78) = 0.89$, *ns*. When only positive stimuli are present, no positive peak effect is evident in the negative affect scale.

For the negatively valenced stimuli, the Low-Negative condition differed from both the High-Negative condition, $t(58) = 3.41$, $p < .001$, and from the Mixed Negative condition, $t(78) = 4.42$, $p < .001$. However, the High-Negative and Mixed-Negative conditions did not significantly differ $t(78) = 0.35$, *ns*. When a strong negative is present, the presence of a weak negative has little impact. This is evidence of a negative peak effect and of Hypothesis 1b. The position of the image on the page did not have a significant impact for either Mixed-Positive, $t(48) = 0.78$, *ns*, or Mixed-Negative, $t(48) = 0.48$, *ns*, conditions.

TABLE 4

Affective Response by Condition (Experiment 1)

	Low Single	High Single	Mixed[1]	ANOVA *F* (2, 107)
Positively Valenced Stimuli	(n=30)	(n=30)	(n=50)	
Positive Affect	3.33a[2] (1.33)	4.13b (1.68)	4.19b (1.38)	3.59*
Negative Affect	1.77a (0.98)	1.52a,b (0.73)	1.38b (0.70)	2.34
Negatively Valenced Stimuli	(n=30)	(n=30)	(n=50)	
Positive Affect	2.33a (0.99)	1.77b (0.59)	1.85b (0.83)	4.22*
Negative Affect	2.61a (1.04)	3.63b (1.27)	3.72b (1.12)	9.83**

Note. All means are based on scales with values ranging from 1 to 7. Standard deviations within each cell are indicated in parentheses.

[1] Mixed refers to conditions where both a High and Low intensity image of a particular valence are jointly presented in the ad.

[2] Cells in the same row with unlike subscripts differ at $p < .05$.

* $p < .05$, ** $p < .001$.

Discussion

Results of this experiment are supportive of a peak mechanism operating when affective stimuli of a given valence are simultaneously presented. Nonetheless, a number of key issues remain outstanding. First, although this experiment supports a peak mechanism, an alternate possibility is that an additive rule is in place, but that the high affect produced by the high negative or high positive stimuli results in a ceiling effect (i.e., when another affective stimulus is added it is not possible to make the perception more extreme than it already is). Hence, an experiment investigating the impact of combining stimuli of moderate intensity would be of value. A second issue of particular importance pertains to the valence associated with the affective stimuli. While the first experiment addresses issues regarding the integration of univalence affective stimuli under simultaneous presentation conditions, it does not address what effect would be observed if affective stimuli of opposite valence are present. These issues are addressed in Experiment 2.

Experiment 2

Participants

A total of 259 students in an introductory marketing course participated for research credit.

Design

Whereas the first experiment held the valence of the integrated affective stimuli constant, this experiment examines the impact of juxtaposing oppositely valenced affective stimuli. The following five between-subject conditions were employed: Positive Single (Pos), Negative Single (Neg), Positive-Positive (PosPos), Negative-Negative (NegNeg), and Mixed Valence (i.e., containing both positively and negatively valenced affective stimuli). There were 40 participants in each of the following groups: Negative Single, Positive-Positive and Negative-Negative. There were 39 participants in the Positive Single condition. There were

100 participants in the Mixed Valence condition.

Advertising Stimuli

The experimental advertisement remained unchanged, with the exception of the subset of images used. In all cases, the images used were moderate in intensity (refer to Table 1). For both categories of affective stimulus (Positive and Negative), five different images were used. For conditions where only one image is present, five different versions of the advertisement were created. For conditions where two images are present, all possible combinations (i.e., 10 in conditions where stimuli are of the same valence, and 25 in the condition where stimuli are of mixed valence) were employed. For the Mixed-Valenced condition, half of the ads had the positively valenced stimulus on the left hand side in order to examine whether the position on the page had an impact. A layout of the advertisement when one image was present is given in Appendix B and a layout of the advertisement when two images were present is given in Appendix C.

Procedure

The procedure was similar to Experiment 1. The experiment was conducted in a lab environment in groups of approximately 15 people per session randomly assigned to condition. Participants were seated in divided cubicles so that they did not have visual access to other individual's stimuli. Participants viewed the print advertisement for thirty seconds and following this they completed a questionnaire that included the measures of affective response. The questionnaire is attached in Appendix A.

Measures

Similar to the previous experiment, affect was measured using the scale developed by Pham et al. (2001). The scale consisted of ten items anchored "1(not at all)" and "7 (very strongly)". A factor analysis employing oblique rotation was conducted with the data from all the 259 participants across the ten items of the affect scale. The eigenvalues are provided in Table 5. The *eigenvalue greater than one* criterion indicates that the items loaded on two separate factors. The first factor consisted of items related to negative affect and the second factor consisted of items related to positive affect.

TABLE 5

Eigenvalues and Variance Explained (Experiment 2)

Component	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
1	4.93	49.26	49.26
2	2.10	21.04	70.31
3	0.64	6.48	76.79
4	0.55	5.52	82.31
5	0.50	5.03	87.34
6	0.35	3.45	90.79
7	0.29	2.85	93.64
8	0.24	2.35	95.99
9	0.21	2.10	98.10
10	0.19	1.91	100.00

The factor loadings for the items on the two factors are indicated from the factor pattern matrix in Table 6. The six items that were related to negative affect were: "I had unpleasant feelings viewing the ad"; "I was disgusted by the ad"; "I was fearful viewing the ad"; "The ad made me feel bad"; "The ad made me feel angry" and "The ad made me feel sad." The four items that were related to positive affect were: "The ad made me feel happy"; "The ad made me feel good"; "The ad made me feel joyful" and "I had pleasant feelings viewing the ad." The correlation between the two factors was -0.36.

TABLE 6

Factor Pattern Matrix for Affect Scale Items (Experiment 2)

Item	Component 1	Component 2
Unpleasant	0.75	-0.12
Happy	-0.07	0.88
Disgusted	0.78	0.05
Good	-0.03	0.89
Fearful	0.80	0.13
Bad	0.84	-0.10
Angry	0.75	0.04
Joyful	-0.03	0.92
Pleasant	-0.03	0.89
Sad	0.75	-0.14

Note. Items loading on the same factor are underlined.

A separate factor analysis including only the positive affect items indicated that these items loaded heavily on a single construct (eigenvalue = 3.25; 81.3% of the variance accounted for; minimum factor loading = 0.89; Cronbach's alpha = 0.92). Another factor analysis including only the negative affect items indicated that these items also loaded on a single construct (eigenvalue = 3.73; 62.2% of the variance accounted for; minimum factor loading = 0.73; Cronbach's alpha = 0.88). Overall scores for each construct were determined by computing the average responses to the items defining positive affect and negative affect.

Results

A MANOVA with positive affect and negative affect as the dependent variables revealed a significant difference across the groups on one or both of the dependant variables Wilks $\lambda = 0.60$, F (8, 506) = 18.16, $p < .001$. Separate ANOVAs were conducted for positive affect and negative affect. The results of the ANOVA indicated that in terms of positive affect, there was a significant difference across the groups, F (4, 254) = 23.04, $p < .001$. The Levene test statistic was 7.48 with 4 and 254 degrees of freedom $p < .001$. This indicates that the variances across the groups were not equal. A more robust test that considers the heterogeneity of variances (the Welch test) was conducted to test the equality of means across the groups. The Welch test statistic was 28.23 with 4 and 105.21 degrees of freedom, $p < .001$. This indicates that there was a difference across the groups in terms of positive affect. In terms of negative affect the results of the ANOVA indicated there was a significant difference across the groups, F (4, 254) = 26.15, $p < .001$. The Levene test statistic was 3.77 with 4 and 254 degrees of freedom, $p < .01$. This indicates that the variances across the groups were not equal. The Welch test statistic was 30.23 with 4 and 106.64 degrees of freedom, $p < .001$. This indicates that there was a difference across the groups in terms of negative affect.

Mean results by condition and type of affect are presented in Table 7. Further analyses of the difference of means between groups are reported below for both positive and negative affect.

Positive Affect Scale. When only positive images are present, the pattern of results is once again consistent with a peak mechanism, with no significant difference being observed between the Pos and PosPos conditions, $t(77) = .20$, *ns*, (i.e., adding an additional positive image is not found to have a significant impact). Similarly, when only negative images are present, no difference exists between Neg and NegNeg conditions, $t(78) = 1.31$, *ns*. When positive and negative images are combined, a compensatory mechanism is witnessed, with the Mixed-Valence condition falling between the two extremes. Specifically, in comparison with the negative conditions, the Mixed-Valence condition is significantly higher than either Neg, $t(138) = 4.33$, $p < .001$, and NegNeg, $t(138) = 5.52$, $p < .001$. Conversely, the Mixed-Valence condition is significantly lower than either the Pos, $t(137) = 3.10$, $p < .01$ or PosPos, $t(138) = 3.27$, $p < .01$, conditions. This supports Hypothesis 2. Furthermore, Neg is found to differ from Pos, $t(77) = 6.45$, $p < .001$ and PosPos, $t(78) = 6.21$, $p < .001$. NegNeg also differs from Pos, $t(77) = 7.53$, $p < .001$, and PosPos $t(78) = 7.19$, $p < .001$. For the Mixed-Valence condition, no difference is observed as a function of the position of the image on the page, $t(98) = 0.14$, *ns*.

Negative Affect Scale. The pattern of results observed for the negative affect scale is similar to that observed for the positive affect scale. No significant difference is observed between Neg and NegNeg, $t(78) = 0.27$, *ns*, or between Pos and PosPos, $t(77) = 0.54$, *ns*. The Mixed-Valence condition is significantly lower than both the Neg, $t(138) = 4.23, p < .001$ and NegNeg, $t(138) = 4.44, p < .001$, conditions, and significantly higher than the Pos, $t(137) = 3.60, p < .001$, and PosPos, $t(138) = 4.06, p < .001$, conditions. This supports Hypothesis 2. Furthermore, Neg significantly differs from Pos, $t(77) = 7.69, p < .001$ and PosPos, $t(78) = 7.96, p < .001$. NegNeg also significantly differs from Pos, $t(77) = 7.51, p < .001$, and PosPos, $t(78) = 7.78, p < .001$. For the Mixed-Valence condition, the position of the image on the page is not found to have a significant impact, $t(98) = 0.57$, *ns*.

TABLE 7

Affective Response By Condition (Experiment 2)

	Positive Single (n = 39)	Negative Single (n = 40)	Pos.-Pos. (n = 40)	Neg.-Neg. (n = 40)	Mixed-Valence (n =100)	ANOVA *F* (4, 254)
Positive Affect	3.81a[1] (1.45)	2.08b (0.87)	3.88a (1.61)	1.84b (0.79)	3.03c (1.27)	23.04*
Negative Affect	1.62a (0.74)	3.25b (1.10)	1.53a (0.82)	3.32b (1.21)	2.34c (1.16)	26.15*

Note. All means are based on scales with values ranging from 1 to 7. Standard deviations within each cell are indicated in parentheses.

[1] Cells in the same row with unlike subscripts differ at $p < .05$.

* $p < .001$.

Discussion

The results of this experiment are consistent with the notion that when stimuli of the same valence are simultaneously presented and integrated, a peak mechanism is in place. Specifically, holding valence constant, no difference was observed between the condition where one stimulus was presented and the one where two were presented. More importantly, results of this experiment support Hypothesis 2, that a compensatory mechanism is employed when stimuli of opposite valence are jointly presented. This was true for both the positive affect scale and the negative affect scale. One caveat to this finding is that all stimuli were of the same (moderate) intensity. As such it may be the case that a peak effect would be observed if the negative affective stimulus clearly was of greater absolute intensity than the positive stimulus and vice versa. While the theory presented would suggest that this will not occur and that a compensatory mechanism will still be observed, an empirical examination of this issue is required. Experiment 3 remedies the current limitation and investigates affect integration in a case where both valence and intensity are manipulated.

Experiment 3

Participants

A total of 358 students in an introductory marketing course participated for research credit.

Design

This experiment examines the impact of juxtaposing oppositely valenced affective stimuli that vary in intensity. The following six between-subject conditions were employed: High Positive Single (High Pos), Low Positive Single (Low Pos), High Negative Single (High Neg), Low Negative Single (Low Neg), High Positive-Low Negative (High Pos-Low Neg) and High Negative-Low Positive (High Neg-Low Pos). There were 40 participants in the Low Positive Single, High Negative Single and Low Negative Single conditions and 38 participants in the High Positive Single condition. There were 100 participants in each of the High Positive-Low Negative condition and the High Negative-Low Positive conditions.

Advertising Stimuli

The experimental advertisement remained unchanged, with the exception of the subset of images used. For all four categories of affective stimulus (High Positive, Low Positive, High Negative and Low Negative), five different images were used (refer to Table 1). For conditions where only one image is present, five different versions of the advertisement were created. For conditions where two images are present, all 25 possible combinations were employed. For both the High Positive-Low Negative and High Negative-Low Positive conditions, half of the ads had the positively valenced stimulus on the left hand side, in order to investigate whether position on the page had an impact. A layout of the advertisement when one image was present is given in Appendix B and a layout of the advertisement when two images were present is given in Appendix C.

Procedure

The procedure was similar to the previous experiments. The experiment was conducted in a lab environment in groups of approximately 15 people per session randomly assigned to condition. Participants were seated in divided cubicles so that they did not have visual access to other individual's stimuli. Participants viewed the print advertisement for thirty seconds and following this they completed a questionnaire that included the measures of affective response as well as measures of attitude towards the ad and attitude towards the brand.

Measures

Similar to the previous experiments, affect was measured using the scale developed by Pham et al. (2001). The scale consisted of ten items anchored "1(not at all)" and "7 (very strongly)". A factor analysis employing oblique rotation was conducted with the data from all the 358 participants across the ten items of the affect scale. The eigenvalues are provided in Table 8. The ***eigenvalue greater than one*** criterion indicates that the ten items loaded on two separate factors. The first factor consisted of items related to negative affect and the second factor consisted of items related to positive affect.

TABLE 8

Eigenvalues and Variance Explained (Experiment 3)

Component	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
1	5.00	50.03	50.03
2	2.38	23.84	73.87
3	0.56	5.55	79.42
4	0.40	3.99	83.41
5	0.36	3.63	87.04
6	0.33	3.25	90.29
7	0.30	3.00	93.29
8	0.26	2.58	95.87
9	0.22	2.23	98.10
10	0.19	1.90	100.00

The factor loadings for the items on the two factors are indicated from the factor pattern matrix in Table 9. The six items that were related to negative affect were: "I had unpleasant feelings viewing the ad"; "I was disgusted by the ad"; "I was fearful viewing the ad"; "The ad made me feel bad"; "The ad made me feel angry" and "The ad made me feel sad." The four items that were related to positive affect were: "The ad made me feel happy"; "The ad made me feel good"; "The ad made me feel joyful" and "I had pleasant feelings viewing the ad." The correlation between the two factors was -0.32.

TABLE 9

Factor Pattern Matrix for Affect Scale Items (Experiment 3)

Item	Component 1	Component 2
Unpleasant	0.77	-0.12
Happy	-0.04	0.88
Disgusted	0.79	-0.04
Good	-0.11	0.87
Fearful	0.86	0.02
Bad	0.86	-0.02
Angry	0.86	0.02
Joyful	0.12	0.93
Pleasant	-0.02	0.89
Sad	0.83	0.09

Note. Items loading on the same factor are underlined.

A separate factor analysis including only the positive affect items indicated that these items loaded heavily on a single construct (eigenvalue = 3.21; 80.2% of the variance accounted for; minimum factor loading = 0.89; Cronbach's alpha = 0.92). Another factor analysis including only the negative affect items indicated that these items also loaded on a single construct (eigenvalue = 4.14; 68.9% of the variance accounted for; minimum factor loading = 0.80; Cronbach's alpha = 0.91). Overall scores for each construct were determined by computing the average responses to the items defining positive affect and negative affect.

Prior literature (e.g., Batra and Ray 1986, Edell and Burke 1987, Derbaix 1995) indicates that the affective responses to an advertisement can impact both ad attitude and brand attitude. In this experiment, the impact of the affective stimuli within the advertisement on attitude measures was also explored. Attitude towards the ad (A_{ad}) was measured with a three item scale. The scale items were likeable (1 being "not all likeable" and 7 being 'likeable'), favorable (1 being 'unfavorable' and 7 being 'favorable') and appealing (1 being 'unappealing' and 7 being 'appealing'). A factor analysis indicated that these items loaded heavily on a single construct (eigenvalue = 2.57; 85.8% of the variance accounted for; minimum factor loading = 0.91; Cronbach's alpha = 0.92). Attitude towards buying the brand (A_{br}) was measured using a ten item scale. The scale items were very good (1 being "very bad" and 7 being "very good"), beneficial (1 being "not beneficial" and 7 being 'beneficial'), important (1 being 'unimportant' and 7 being 'important'), wise (1 being 'foolish' and 7 being 'wise'), unattractive (1 being 'unattractive' and 7 being 'attractive'), useful (1 being 'useless' and 7 being 'useful'), desirable (1 being 'undesirable' and 7 being 'desirable'), valuable (1 being 'worthless' and 7 being 'valuable'), needed (1 being "not needed" and 7 being 'needed') and positive (1 being 'negative' and 7 being 'positive'). A factor analysis indicated that these items loaded on a single construct (eigenvalue = 6.50; 65.0% of the variance accounted for; minimum factor loading = 0.69; Cronbach's alpha = 0.94).

Results

Affect Measures. A MANOVA with positive affect and negative affect as the dependent variables revealed a significant difference across the groups on one or both of the dependant variables Wilks $\lambda = 0.62$, F (10, 702) =19.33, $p < .001$. A separate ANOVA was conducted for both positive affect and negative affect. The results of the ANOVA indicated that in terms of positive affect, there was a significant difference across the groups, F (5, 352) = 23.36, $p < .001$. The Levene test statistic was 1.72 with 5 and 352 degrees of freedom, *ns*. This indicates that the variances across the groups were not different and the results of the ANOVA are acceptable. In terms of negative affect, there was a significant difference across the groups, F (5, 352) = 25.13, $p < .001$. The Levene test statistic was 13.66 with 5 and 352 degrees of freedom, $p < .001$. This indicates that the variances across the groups were not equal. A more robust test that considers the heterogeneity of variances (the Welch test) was conducted to test the equality of the means across the groups. The Welch test statistic was 33.26 with 5 and 131.30 degrees of freedom, $p < .001$. This indicates that there was a difference across the groups in terms of negative affect.

Mean results by condition and type of affect are presented in Table 10. Further analyses of the difference of means between groups are reported below for both positive and negative affect.

Positive Affect Scale. The results support the compensatory mechanism proposed in Hypothesis 2. Specifically, the High Pos-Low Neg condition is higher than the Low Neg condition $t(138) = 4.41$, $p < .001$ and lower than the High Pos condition $t(136) = 3.87$, $p < .001$. Similarly, the High Neg-Low Pos condition is higher than the High Neg condition $t(138) = 2.90$, $p < .01$and lower than the Low

Pos condition $t(138) = 4.57$, $p < .001$. Furthermore, High Pos is found to differ from Low Pos, $t(76) = 2.07$, $p < .05$ and High Neg differs from Low Neg, $t(78) = 2.06$, $p < .05$. For both the High Pos-Low Neg and High Neg-Low Pos conditions, no difference was observed as a function of the position of the image on the page.

Negative Affect Scale. Similar to the results for the positive affect scale, the results further support Hypothesis 2. Specifically, the High Pos-Low Neg condition is lower than the Low Neg condition $t(138) = 2.08$, $p < .05$ and higher than the High Pos condition $t(136) = 4.19$, $p < .001$. Similarly, the High Neg-Low Pos condition is lower than the High Neg condition $t(138) = 2.35$, $p < .05$ and higher than the Low Pos condition $t(138) = 5.47$, $p < .001$. Furthermore, High Neg is found to differ from Low Neg, $t(78) = 3.85$, $p < .001$. In terms of negative affect, High Pos and Low Pos do not differ, $t(76) = 1.92$, *ns*. For both the High Pos-Low Neg and High Neg-Low Pos conditions, no difference was observed as a function of the position of the image on the page.

TABLE 10

Affective Response, Attitude Towards the Ad and Attitude Towards Buying the Brand By Condition (Experiment 3)

	High Pos (n=38)	Low Pos (n=40)	High Neg (n=40)	Low Neg (n=40)	High Pos.-Low Neg. (n=100)	High Neg.-Low Pos. (n=100)	ANOVA *F* (5, 352)
Pos. Affect	4.24a[1] (1.46)	3.57b (1.39)	1.81d (1.03)	2.31c (1.14)	3.29b (1.21)	2.46c (1.26)	23.36*
Neg. Affect	1.38e (0.50)	1.67e (0.81)	3.64 a (1.45)	2.47c (1.27)	2.06d (0.95)	3.00b (1.45)	25.13*
A_{ad}	4.68a (1.24)	4.04b (1.40)	2.88d (1.67)	3.63b, c (1.69)	4.05b (1.31)	3.23c,d (1.43)	9.96*
A_{br}	4.80a (1.04)	4.61a, b (0.93)	3.85c (1.32)	4.04c (0.97)	4.45b (0.91)	4.11c (1.08)	5.67*

Note. All means are based on scales with values ranging from 1 to 7. Standard deviations within each cell are indicated in parentheses.

[1] Cells in the same row with unlike subscripts differ at $p < .05$.

* $p < .001$.

Attitude Towards the Ad. The means across the conditions are provided in Table 10. An ANOVA with attitude towards the ad as the dependent variable indicated that there a significant difference across the groups, F (5, 352) = 9.96, $p < .001$. The Levene test statistic was 1.65 with 5 and 352 degrees of freedom, *ns*. This indicates that the variances across the groups were not different and the results of the ANOVA are acceptable. The High Pos condition was different from the Low Pos condition, $t(76) = 2.11$, $p < .05$. The High Neg condition differed from the Low Neg condition, $t(78) = 2.02$, $p < .05$. The High Pos-Low Neg condition was lower than High Pos condition, $t(136) = 2.54$, $p < .05$. However, the High Pos-Low Neg condition was not significantly different than the Low Neg condition, *t*(138) = 1.56, *ns*. The High Neg –Low Pos condition was lower than the Low Pos condition, *t*(138) = 3.07, $p < .01$. However, the High Neg-Low Pos condition was not significantly different than the High Neg condition, *t*(138) = 1.25, *ns*.

Attitude Towards Buying The Brand. The means across the conditions are provided in Table 10. An ANOVA with attitude towards buying the brand as the dependent variable indicated that there a significant difference across the groups, F (5, 352) = 5.67, $p < .001$. The Levene test statistic was 1.59 with 5 and 352 degrees of freedom, *ns*. This indicates that the variances across the groups were not different and the results of the ANOVA are acceptable. The High Pos condition was not different than the Low Pos condition, *t*(76) = 0.86, *ns*. The High Neg condition was also not different than the Low Neg condition, *t*(78) = 0.74, *ns*. The High Pos-Low Neg condition was lower than High Pos condition, *t*(136) = 1.95, $p = .05$ and significantly higher than the Low Neg condition, *t*(138) = 2.37, $p < .05$. The High Neg –Low Pos condition was not different than the High Neg condition, *t*(138) = 1.18, *ns*. However, the High Neg-Low Pos condition was significantly lower than the Low Pos condition, *t*(138) = 2.59, $p < .05$.

Regression Analyses

In order to further explore the results, a number of regression analyses were first conducted with the data from all the conditions combined and were subsequently conducted with the data from the various experimental conditions.

Regression Analyses on Data from All Conditions. The first and second regression analyses were conducted on the combined data across all the experimental conditions.

In the first regression model, the dependent variable was positive affect and the explanatory variables were the affective value of the positive image and the affective value of the negative image in the advertisement. The regression model was estimated with the data from all 358 respondents across the six groups. The affective values of the positive image and negative image were obtained from the pre-test results for the images. As the scale used in the pre-test was a bi-polar scale, the values of the negative images were reverse coded to indicate their level of negativeness. In conditions when there was only one positive image (i.e., High Positive and Low Positive conditions) the negative image was assigned a value of zero and in conditions when there was only one negative image (i.e., High Negative and Low Negative conditions) the positive image was assigned a value of zero. The model was significant as can be seen from the analysis of variance table (Table 11).

TABLE 11

Analysis of Variance Table for Regression Model
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Positive Affect
Date Set: All Conditions (Experiment 3)

	Sum of Squares	df	Mean Square	F	*p* value
Model	173.34	2	86.67	55.04	$p < .001$
Error	558.98	355	1.58		
Total	732.32	357			

The regression coefficients are provided in Table 12. Both positive image and negative image were significant indicating that both these variables impacted positive affect. This supports the proposed compensatory mechanism. The results indicate that an increase in the affective value of the positive image increases positive affect. In other words, an increase in the positiveness of the positive image increases the overall positive affect experienced. The results also indicate that a decrease in the affective value of the negative image increases positive affect. In other words, a decrease in the negativeness of the negative image increases the overall positive affect experienced.

TABLE 12

Regression Coefficients
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Positive Affect
Date Set: All Conditions (Experiment 3)

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	2.98	0.19	15.64	$p < .001$
Positive Image (Affective Value)	0.26	0.05	5.02	$p < .001$
Negative Image (Affective Value)	- 0.28	0.05	- 5.81	$p < .001$

In the second regression model, the dependent variable was negative affect and the explanatory variables were the affective value of the positive image and the affective value of the negative image in the advertisement. The regression model was estimated with the data from all 358 respondents across the six groups. The affective values of the positive image and negative image were obtained from the pre-test results for the images. As the scale used in the pre-test was a bi-polar scale, the values of the negative images were reverse coded to indicate their level of negativeness. In conditions when there was one only one positive image (i.e., High Positive and Low Positive conditions) the negative image was assigned a value of zero and in conditions where there was only one negative image (i.e., High Negative and Low Negative conditions) the positive image was assigned a value of zero. The model was significant as can be seen from the analysis of variance table (Table 13).

TABLE 13

Analysis of Variance Table for Regression Model
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Negative Affect
Date Set: All Conditions (Experiment 3)

	Sum of Squares	df	Mean Square	F	*p* value
Model	168.17	2	84.08	62.40	$p < .001$
Error	478.33	355	1.35		
Total	646.49	357			

The regression coefficients are provided in Table 14. Both positive image and negative image were significant indicating that both these variables impacted negative affect. This supports the proposed compensatory mechanism. The results indicate that a decrease in the affective value of the positive image increases negative affect. The results also indicate that an increase in the affective value of the negative image increases negative affect.

TABLE 14

Regression Coefficients
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Negative Affect
Date Set: All Conditions (Experiment 3)

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	1.93	0.18	10.92	$p < .001$
Positive Image (Affective Value)	- 0.14	0.05	- 2.85	$p < .01$
Negative Image (Affective Value)	0.37	0.05	8.23	$p < .001$

The regression analyses on the data set from all the conditions fits the proposed compensatory model as both the positive and negative image have an impact on both affective scales in the expected directions. In order to investigate whether this is also evident across the different types of experimental conditions (positive single conditions, negative single conditions and mixed conditions), a number of further regression analyses were conducted.

Regression Analyses on Data from Positive Conditions (High Pos, Low Pos). The third and fourth regression models were estimated with the data from the 78 respondents in the positive single conditions: High Positive and Low Positive. In the third regression model, the dependent variable was positive affect and the explanatory variable was the affective value of the positive image in the advertisement (there were no negative images in these conditions). The affective values of the positive images were obtained from the pre-test results for the images. The model was significant as can be seen from the analysis of variance table (Table 15).

TABLE 15

Analysis of Variance Table for Regression Model
Explanatory Variable: Positive Image
Dependent Variable: Positive Affect
Data Set: High Pos, Low Pos Conditions

	Sum of Squares	df	Mean Square	F	*p* value
Model	10.81	1	10.81	5.39	$p < .05$
Error	152.51	76	2.01		
Total	163.32	77			

The regression coefficients are provided in Table 16. The positive image was significant indicating that this variable impacted positive affect. As expected, the results indicate that an increase in the affective value of the positive image increases positive affect. In other words, an increase in the positiveness of the positive image increases the overall positive affect experienced.

TABLE 16

Regression Coefficients
Explanatory Variable: Positive Image
Dependent Variable: Positive Affect
Data Set: High Pos, Low Pos Conditions

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	2.99	0.42	7.07	$p < .001$
Positive Image (Affective Value)	0.35	0.15	2.32	$p < .05$

In the fourth regression model, the dependent variable was negative affect and the explanatory variable was the affective value of the positive image in the advertisement (there were no negative images in these conditions). The affective values of the positive images were obtained from the pre-test results for the images. The model was marginally significant as can be seen from the analysis of variance table (Table 17).

TABLE 17

Analysis of Variance Table for Regression Model
Explanatory Variable: Positive Image
Dependent Variable: Negative Affect
Data Set: High Pos, Low Pos Conditions (Experiment 3)

	Sum of Squares	df	Mean Square	F	*p* value
Model	1.31	1	1.31	2.85	$p < .10$
Error	35.04	76	0.46		
Total	36.36	77			

The regression coefficients are provided in Table 18. The positive image was marginally significant indicating that this variable impacted negative affect. As expected, the results indicate that an increase in the affective value of the positive image decreased negative affect. In other words, an increase in the positiveness of the positive image decreases the overall negative affect experienced.

TABLE 18

Regression Coefficients
Explanatory Variable: Positive Image
Dependent Variable: Negative Affect
Data Set: High Pos, Low Pos Conditions (Experiment 3)

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	1.84	0.20	9.11	$p < .001$
Positive Image (Affective Value)	-0.12	0.07	-1.69	$p < .10$

Regression Analyses on Data from Negative Conditions (High Neg, Low Neg). The fifth and sixth regression models were estimated with the data from the 80 respondents in the negative single conditions: High Negative and Low Negative. In the fifth regression model, the dependent variable was positive affect and the explanatory variable was the affective value of the negative image in the advertisement (there were no positive images in these conditions). The affective values of negative images were obtained from the pre-test results for the images. As the scale used in the pre-test was a bi-polar scale, the values of the negative images were reverse coded to indicate their level of negativeness. The model was significant as can be seen from the analysis of variance table (Table 19).

TABLE 19

Analysis of Variance Table for Regression Model
Explanatory Variable: Negative Image
Dependent Variable: Positive Affect
Data Set: High Neg, Low Neg Conditions

	Sum of Squares	df	Mean Square	F	*p* value
Model	7.06	1	7.06	6.11	$p < .05$
Error	90.06	78	1.16		
Total	97.12	79			

The regression coefficients are provided in Table 20. The negative image was significant indicating that this variable impacted positive affect. As expected, the results indicate that an increase in the affective value of the negative image decreases positive affect. In other words, an increase in the negativeness of the negative image decreases the overall positive affect experienced.

TABLE 20

Regression Coefficients
Explanatory Variable: Negative Image
Dependent Variable: Positive Affect
Data Set: High Neg, Low Neg Conditions

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	2.73	0.30	9.21	$p < .001$
Negative Image (Affective Value)	-0.25	0.10	-2.47	$p < .05$

In the sixth regression model, the dependent variable was negative affect and the explanatory variable was the affective value of the negative image in the advertisement (there were no positive images in these conditions). The affective values of negative images were obtained from the pre-test results for the images. As the scale used in the pre-test was a bi-polar scale, the values of the negative images were reverse coded to indicate their level of negativeness. The model was significant as can be seen from the analysis of variance table (Table 21).

TABLE 21

Analysis of Variance Table for Regression Model
Explanatory Variable: Negative Image
Dependent Variable: Negative Affect
Data Set: High Neg, Low Neg Conditions (Experiment 3)

	Sum of Squares	df	Mean Square	F	*p* value
Model	32.47	1	32.47	18.21	$p < .001$
Error	139.06	78	1.78		
Total	171.53	79			

The regression coefficients are provided in Table 22. The negative image was significant indicating that this variable impacted negative affect. As expected, the results indicate that an increase in the affective value of the negative image increases negative affect. In other words, an increase in the negativeness of the negative image increases the overall negative affect experienced.

TABLE 22

Regression Coefficients
Explanatory Variable: Negative Image
Dependent Variable: Negative Affect
Data Set: High Neg, Low Neg Conditions (Experiment 3)

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	1.62	0.37	4.39	$p < .001$
Negative Image (Affective Value)	0.53	0.12	4.27	$p < .001$

Regression Analyses on Data from Mixed Conditions (High Pos-Low Neg, High Neg-Low Pos). The seventh and eight regression models were estimated with the data from the 200 respondents in the mixed conditions: High Pos-Low Neg and High Neg-Low Pos. In the seventh regression model, the dependent variable was positive affect and the explanatory variables were the affective value of the positive image and the affective value of the negative image in the advertisement. The affective values of the positive image and negative image were obtained from the pre-test results for the images. As the scale used in the pre-test was a bi-polar scale, the values of the negative images were reverse coded to indicate their level of negativeness. The model was significant as can be seen from the analysis of variance table (Table 23).

TABLE 23

Analysis of Variance Table for Regression Model
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Positive Affect
Data Set: High Pos-Low Neg, High Neg-Low Pos Conditions (Experiment 3)

	Sum of Squares	df	Mean Square	F	*p* value
Model	36.02	2	18.01	11.76	$p < .001$
Error	301.73	197	1.53		
Total	337.75	199			

The regression coefficients are provided in Table 24. In this case, both the positive image and negative image were not significant.

TABLE 24

Regression Coefficients
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Positive Affect
Data Set: High Pos-Low Neg, High Neg-Low Pos Conditions (Experiment 3)

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	3.15	2.08	1.52	$p > .10$
Positive Image (Affective Value)	0.13	0.41	0.33	$p > .10$
Negative Image (Affective Value)	-0.23	0.37	-0.64	$p > .10$

In the eight regression model, the dependent variable was negative affect and the explanatory variables were the affective value of the positive image and the affective value of the negative image in the advertisement. The affective values of the positive image and negative image were obtained from the pre-test results for the images. As the scale used in the pre-test was a bi-polar scale, the values of the negative images were reverse coded to indicate their level of negativeness. The model was significant as can be seen from the analysis of variance table (Table 25).

TABLE 25

Analysis of Variance Table for Regression Model
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Negative Affect
Data Set: High Pos-Low Neg, High Neg-Low Pos Conditions (Experiment 3)

	Sum of Squares	df	Mean Square	F	*p* value
Model	45.39	2	22.69	15.07	$p < .001$
Error	296.77	197	1.51		
Total	342.15	199			

The regression coefficients are provided in Table 26. In this case, both the positive image and negative image were not significant.

TABLE 26

Regression Coefficients
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Negative Affect
Data Set: High Pos-Low Neg, High Neg-Low Pos Conditions (Experiment 3)

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	1.24	2.06	0.60	$p >.10$
Positive Image (Affective Value)	0.04	0.41	0.11	$p >.10$
Negative Image (Affective Value)	0.43	0.37	1.19	$p >.10$

As stated earlier, the regression analyses on the data set from all the conditions fits the proposed compensatory model as both the positive and negative image have an impact on both affective scales in the expected directions. Similarly, the regression analyses with the data from the positive single conditions indicate that the positive image impacts both positive affect and negative affect. The regression analyses with the data from the negative single conditions also indicate that the negative image impacts both positive affect and negative affect. However, the regression analyses with the data from the mixed conditions indicate that there is no significant impact of the positive or negative image on either affective scale. This may be due to high collinearity between the independent variables in the data from the mixed conditions. In these conditions, the Pearson's correlation between the affective value of the positive images and the affective value of the negative images was -0.98 ($p < .001$), leading to insignificant results for the coefficients in the regression models (see, Jobson 1991 for a review of collinearity and its impact on regression coefficients).

Discussion

The results from the ANOVA analysis support the theory that when oppositely valenced affective stimuli are integrated in a simultaneous presentation context, a compensatory mechanism best describes the process of affect integration. This is true not only when the affective stimuli are of the same intensity (Experiment 2), but also when they are of differing intensity (Experiment 3). Such a compensatory process is not observed in the case of sequential presentation, underlying support that mode of presentation has a significant impact in affect integration. There was also a significant difference across the conditions in terms of attitude towards the ad and attitude towards buying the brand, indicating the different types of affective elements within an ad can impact attitude. However, in terms of the attitude towards the ad, the compensatory process was not observed in both the mixed conditions. Rather, a negativity bias was observed, with the High Neg-Low Pos condition being similar in terms of attitude towards the ad as the High Neg condition and the High Pos-Low Neg condition being similar in terms of attitude towards the ad as the Low Neg condition. In terms of attitude towards buying the brand the compensatory process was observed in one of the mixed conditions (High Pos-Low Neg) and not the other (High Neg-Low Pos).

The results obtained in the first three experiments offer predictions regarding the impact of the frequency of affective stimuli in simultaneous affect integration. The peak mechanism observed in univalence affect integration (Experiment 1 and Experiment 2) implies that there will be frequency neglect in univalence affect integration in a simultaneous presentation context. The compensatory mechanism observed in oppositely valenced affect integration (Experiment 2 and Experiment 3) indicates that there will be frequency effects in oppositely valenced affect integration in a simultaneous presentation context. These predictions are tested in Experiment 4 and Experiment 5 respectively.

Experiment 4

Participants

A total of 158 students in an introductory marketing course participated for research credit.

Design

This experiment examines the impact of the frequency (number) of the affective stimuli on the affect integration process. This is investigated in the context of univalence stimuli. Although positive and negative stimuli are not combined in the same conditions, the impact of the frequency of both positive and negative affective images is examined. The experiment investigates whether increasing the number of positive images in an advertisement with only positive images will increase the overall positiveness of the advertisement. Similarly, the experiment investigates whether increasing the number of negative images in an advertisement with only negative images will increase the negativeness of the advertisement. Although, this was examined earlier in Experiment 2 by comparing the positive single and positive-positive conditions (as well as the negative single and negative-negative conditions), this is further tested in this experiment by comparing a single positive condition with a condition where there are three positive stimuli (and also comparing a single negative condition with a condition where there are three negative stimuli). As such, this experiment is a more conservative test of the frequency neglect hypothesis in univalence affect integration in a simultaneous presentation context. The following four between subject conditions were employed: Positive Single (1 Pos), Three Positive (3 Pos), Negative Single (1 Neg) and Three Negative (3 Neg). There were 48 participants in each of the 3 Pos and 3 Neg conditions. There were 30 participants in the 1 Pos condition. There were 32 participants in the 3 Neg condition.

Advertising Stimuli

The same type of print advertisement as used in earlier experiments was used for this experiment. The only difference was in the subset of images used. Each image was approximately 3" X 3". As this experiment only manipulated the frequency of positive and negative images in the advertisement and not the intensity of the images, all images used were of moderate intensity (refer to Table 1). For both moderate positive and moderate negative affective stimuli, four different images were used (from the moderate positive images "woman holding champagne glass" was not used and from the moderate negative images "little girl looking sad" was not used.) For both the 1 Pos and 1 Neg condition, all four unique advertisements were used. In conditions where there was 1 image (i.e., 1 Pos and 1 Neg conditions), the image was placed in the center of the advertisement. For the 3 Pos condition, all four possible combinations of the images were used. Similarly for the 3 Neg condition, all four possible combinations of the images were used. In conditions where there 3 images (i.e., 3 Pos and 3 Neg conditions), two images were placed on top of the third image in an inverted triangular format. A layout of the advertisement when one image was present is given in Appendix D and a layout of the advertisement when three images were present is given in Appendix E. Finally, the position of the image on the page was also controlled. In both the 3 Pos and 3 Neg conditions, for each of the four unique image combinations, all the six possible combinations of image location were considered. This generated 24 unique advertisements for both the 3 Pos and 3 Neg conditions, which were all used.

Procedure

The procedure was similar to the previous experiments. The experiment was conducted in a lab environment in groups of approximately 15 people per session randomly assigned to condition. Participants were seated in divided cubicles so that they did not have visual access to other individual's stimuli. Participants viewed the print advertisement for thirty seconds and following this they completed a questionnaire that included measures of affective response, attitude towards the ad and attitude towards buying the brand.

Measures

Similar to the previous experiments, affect was measured using the scale developed by Pham et al. (2001). The scale consisted of ten items anchored "1(not at all)" and "7 (very strongly)". A factor analysis employing oblique rotation was conducted with the data from all the 158 participants across the ten items of the affect scale. The eigenvalues are provided in Table 27. The *eigenvalue greater than one* criterion indicates that the items loaded on two separate factors. The first factor consisted of items related to negative affect and the second factor consisted of items related to positive affect.

TABLE 27

Eigenvalues and Variance Explained (Experiment 4)

Component	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
1	5.99	59.94	59.94
2	1.78	17.80	77.74
3	0.59	5.87	83.61
4	0.43	4.27	87.88
5	0.38	3.83	91.71
6	0.24	2.41	94.12
7	0.19	1.89	96.01
8	0.17	1.67	97.68
9	0.13	1.31	98.99
10	0.10	1.01	100.00

The factor loadings for the items on the two factors are indicated from the factor pattern matrix in Table 28. The six items that were related to negative affect were: "I had unpleasant feelings viewing the ad"; "I was disgusted by the ad"; "I was fearful viewing the ad"; "The ad made me feel bad"; "The ad made me feel angry" and "The ad made me feel sad." The four items that were related to positive affect were: "The ad made me feel happy"; "The ad made me feel good"; "The ad made me feel joyful" and "I had pleasant feelings viewing the ad." The correlation between the two factors was -0.47.

TABLE 28

Factor Pattern Matrix for Affect Scale Items (Experiment 4)

Item	Component 1	Component 2
Unpleasant	0.75	-0.22
Happy	-0.02	0.94
Disgusted	0.81	-0.07
Good	-0.04	0.92
Fearful	0.88	0.22
Bad	0.77	-0.22
Angry	0.84	0.04
Joyful	-0.01	0.94
Pleasant	-0.03	0.92
Sad	0.72	-0.18

Note. Items loading on the same factor are underlined.

A separate factor analysis including only the positive affect items indicated that these items loaded heavily on a single construct (eigenvalue = 3.56; 89.0% of the variance accounted for; minimum factor loading = 0. 94; Cronbach's alpha = 0.96). Another factor analysis including only the negative affect items indicated that these also loaded on a single construct (eigenvalue = 4.13; 68.7% of the variance accounted for; minimum factor loading = 0.73; Cronbach's alpha = 0.91). Overall scores for each construct were determined by computing the average responses to the items defining positive affect and negative affect.

Similar to Experiment 3, in this experiment, in addition to affect, participants' attitude towards the ad and attitude towards buying the brand were also measured. Attitude towards the ad (A_{ad}) was measured with a three item scale. The scale items were likeable (1 being "not all likeable" and 7 being 'likeable'), favorable (1 being 'unfavorable' and 7 being 'favorable') and appealing (1 being 'unappealing' and 7 being 'appealing'). A factor analysis indicated that these items loaded heavily on a single construct (eigenvalue = 2.54; 84.7% of the variance accounted for; minimum factor loading = 0.89; Cronbach's alpha = 0.91). Attitude towards buying the brand (A_{br}) was measured using a ten item scale. The scale items were very good (1 being "very bad" and 7 being "very good"), beneficial (1 being "not beneficial" and 7 being 'beneficial'), important (1 being 'unimportant' and 7 being 'important'), wise (1 being 'foolish' and 7 being 'wise'), unattractive (1 being 'unattractive' and 7 being 'attractive'), useful (1 being 'useless' and 7 being 'useful'), desirable (1 being 'undesirable' and 7 being 'desirable'), valuable (1 being 'worthless' and 7 being 'valuable'), needed (1 being "not needed" and 7 being 'needed') and positive (1 being 'negative' and 7 being 'positive'). A factor analysis indicated that these items loaded on a single construct (eigenvalue = 6.00; 60.0% of the variance accounted for; minimum factor loading = 0.65; Cronbach's alpha = 0.93).

Results

Affective Measures. A MANOVA with positive affect and negative affect as the dependent variables revealed a significant difference across the groups on one or more of the dependant variables Wilks $\lambda = 0.43$, F (6, 306) = 26.40, $p < .001$. A separate ANOVA was conducted for both positive affect and negative affect. The results of the ANOVA indicated that in terms of positive affect, there was a significant difference across the groups, F (3, 154) = 42.78, *p* < .001. The Levene test statistic was 7.14 with 3 and 154 degrees of freedom, *p* < .001. This indicates that the variances across the groups were not equal. A more robust test that considers the heterogeneity of variances (the Welch test) was conducted to test the equality of means across the groups. The Welch test statistic was 47.53 with 3 and 75.34 degrees of freedom, *p* < .001. This indicates that there was a difference across the groups in terms of positive affect. In terms of negative affect, there was a significant difference across the groups, F (3, 154) = 38.08, *p* < .001.The Levene test statistic was 5.05 with 3 and 154 degrees of freedom, *p* < .01. This indicates that the variances across the groups were not equal. The Welch test statistic was 37.73 with 3 and 76.81 degrees of freedom, *p* < .001. This indicates that there was a difference across the groups in terms of negative affect.

Mean results by condition and type of affect are presented in Table 29. Further analyses of the difference of means between groups are reported below for both positive and negative affect.

Positive Affect Scale. The results on this dimension are consistent with frequency neglect. Specifically, the 1 Pos and the 3 Pos condition did not differ in the level of positive affect evoked, *t*(76) = 1.15, *ns*. Increasing the number of positive stimuli from one to three did not create additional positive response. These results support hypothesis 4a. The 1 Neg and 3 Neg condition also did not differ in terms of positive affect *t*(78) = 0.62, *ns*. The 1 Pos condition differed from the 1 Neg condition *t*(60) = 5.23, *p* < .001 and the 3 Neg condition *t*(76) =

6.55, $p < .001$. The 3 Pos condition also differed from 1 Neg condition $t(78) = 8.76$, $p < .001$ and the 3 Neg condition $t(94) = 10.73$, $p < .001$.

Negative Affect Scale. The results on this dimension are also consistent with frequency neglect. Specifically, the 1 Neg and the 3 Neg condition did not differ in the level of negative affect evoked, $t\ (78) = 0.47$, *ns*. Increasing the number of negative stimuli from one to three did not create additional negative response. These results support hypothesis 4b. The 1 Pos and 3 Pos condition also did not differ in terms of negative affect $t(76) = 0.21$, *ns*. The 1 Pos condition differed from the 1 Neg condition $t(60) = 6.51$, $p < .001$ and the 3 Neg condition $t(76) = 7.09$, $p < .001$. The 3 Pos condition also differed from 1 Neg condition $t(78) = 7.65$, $p < .001$ and the 3 Neg condition $t(94) = 8.47$, $p < .001$.

TABLE 29

Affective Response, Attitude Towards the Ad and Attitude Towards Buying the Brand By Condition (Experiment 4)

	Single Positive (n=30)	Three Positives (n=48)	Single Negative (n=32)	Three Negatives (n=48)	ANOVA *F* (3, 154)
Positive Affect	3.80a[1] (1.69)	4.17a (1.17)	1.99b (0.95)	1.86b (0.93)	42.78**
Negative Affect	1.57a (0.89)	1.61a (0.81)	3.33b (1.21)	3.46b (1.28)	38.08**
A_{ad}	4.61a (1.44)	4.32a,b (1.38)	3.75b,c (1.40)	3.63c (1.25)	4.43*
A_{br}	4.67a (0.92)	4.50a (1.01)	4.60a (0.82)	4.31a (0.97)	1.09

Note. All means are based on scales with values ranging from 1 to 7. Standard deviations within each cell are indicated in parentheses.
[1] Cells in the same row with unlike subscripts differ at $p < .05$.
** $p < .001$, * $p < .01$.

Attitude Towards the Ad. The means across the conditions are provided in Table 29. An ANOVA with attitude towards the ad as the dependent variable indicated that there a significant difference across the groups, F (3, 154) = 4.43, $p < .01$. The Levene test statistic was 0.53 with 3 and 154 degrees of freedom, *ns*. This indicates that the variances across the groups were not different and the results of the ANOVA are acceptable. In terms of attitude towards the ad, the 1 Pos and 3 Pos were not different, $t(76) = 0.90$, *ns*. Similarly, the 1 Neg and 3 Neg condition were not different, $t(78) = 0.42$, *ns*. The difference between the 1 Pos and 1 Neg was significant, $t(60) = 2.39$, $p < .05$, and the difference between 1 Pos and 3 Neg was also significant, $t(76) = 3.19$, $p < .01$. Furthermore, the difference between the 3 Pos and 1 Neg condition was marginally significant, $t(78) = 1.80$, $p < .08$ and the 3 Pos and 3 Neg condition was also significant, $t(94) = 2.59$, $p < .05$.

Attitude Towards Buying the Brand. The means across the conditions are provided in Table 29. An ANOVA with attitude towards buying the brand as the dependent variable indicated that there no significant difference across the groups, $F(3, 154) = 1.09$, *ns*.

Discussion

The results of this experiment are consistent with the notion that when stimuli of the same valence are simultaneously presented, a peak mechanism explains affect integration. Specifically, holding valence constant, no difference was observed between the condition where one stimulus was presented and the condition where three were presented. This was true for both the positive affect scale and the negative affect scale. The significant impact of the affective stimuli in the advertisement on attitude towards the ad supports the notion that affective stimuli can impact ad attitudes. However, there was no impact of the affective stimuli in the advertisement on attitude towards buying the brand.

The results of Experiment 4 indicate that there is 'frequency neglect' in univalence affect integration in a simultaneous presentation condition. In the case of oppositely valenced affect integration in a simultaneous presentation context, frequency effects are expected as there is a compensatory mechanism operating. This is investigated in Experiment 5.

Experiment 5

Participants

A total of 150 students in an introductory marketing course participated for research credit.

Design

This experiment examines the impact of the frequency of affective stimuli when juxtaposing oppositely valenced affective stimuli. The following three between-subject conditions were employed: 1 Positive-1 Negative (1 Pos-1 Neg), 3 Positive-1 Negative (3 Pos-1 Neg) and 1 Positive-3 Negative (1 Pos-3 Neg). There were 50 participants in each of the groups.

Advertising Stimuli

The experimental advertisement remained unchanged, with the exception of the subset of images used. Each image was approximately 3" X 3". In all cases, the images used were moderate in intensity (refer to Table 1). For both categories of affective stimulus (Positive and Negative), five different images were used. For the 1 Pos-1 Neg condition, all 25 possible combinations were employed. Furthermore, the position of the positive and negative image on the page was counter balanced. For both the 3 Pos-1 Neg condition and the 1 Pos-3 Neg condition, all possible image combinations were used. This generated 50 unique advertisements for each of these conditions. In these conditions, the four images on the page were presented in a square format with each image located in one of four quadrants. A layout of the advertisement when two images were present is given in Appendix F and a layout of the advertisement when four images were present is given in Appendix G. An effort was made to control for the location of the image on the page. Based on location in four quadrants, there are 24 possible combinations for four distinct images. The 50 image combinations were randomly assigned to one of the 24 possible location combinations.

Procedure

The procedure was similar to the previous experiments. The experiment was conducted in a lab environment in groups of approximately 15 people per session randomly assigned to condition. Participants were seated in divided cubicles so that they did not have visual access to other individual's stimuli. Participants viewed the print advertisement for thirty seconds and following this they completed a questionnaire that included the measures of affective response, attitude towards the ad and attitude towards buying the brand.

Measures

Similar to the previous experiments, affect was measured using the scale developed by Pham et al. (2001). The scale consisted of ten items anchored "1(not at all)" and "7 (very strongly)". A factor analysis employing oblique rotation was conducted with the data from all the 150 participants across the ten items of the affect scale. The eigenvalues are provided in Table 30. The *eigenvalue greater than one* criterion indicates that the ten items loaded on two separate factors. The first factor consisted of items related to negative affect and the second factor consisted of items related to positive affect.

TABLE 30

Eigenvalues and Variance Explained (Experiment 5)

Component	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
1	4.38	43.77	43.77
2	2.39	23.91	67.68
3	0.75	7.52	75.20
4	0.64	6.38	81.58
5	0.43	4.29	85.87
6	0.38	3.80	89.67
7	0.34	3.44	93.11
8	0.26	2.55	95.66
9	0.23	2.31	97.96
10	0.20	2.04	100.00

The factor loadings for the items on the two factors are indicated from the factor pattern matrix in Table 31. The six items that were related to negative affect were: "I had unpleasant feelings viewing the ad"; "I was disgusted by the ad"; "I was fearful viewing the ad"; "The ad made me feel bad"; "The ad made me feel angry" and "The ad made me feel sad." The four items that were related to positive affect were: "The ad made me feel happy"; "The ad made me feel good"; "The ad made me feel joyful" and "I had pleasant feelings viewing the ad."

TABLE 31

Factor Pattern Matrix for Affect Scale Items (Experiment 5)

Item	Component 1	Component 2
Unpleasant	0.77	-0.18
Happy	-0.03	0.87
Disgusted	0.81	-0.06
Good	-0.01	0.87
Fearful	0.63	0.01
Bad	0.85	0.05
Angry	0.83	0.08
Joyful	0.01	0.86
Pleasant	0.01	0.84
Sad	0.83	0.05

Note. Items loading on the same factor are underlined.

A separate factor analysis including only the positive affect items indicated that these items loaded heavily on a single construct (eigenvalue = 2.97; 74.3% of the variance accounted for; minimum factor loading = 0.84; Cronbach's alpha = 0.88). A separate factor analysis including only the negative affect items also indicated that these items loaded on a single construct (eigenvalue = 3.76; 62.6% of the variance accounted for; minimum factor loading = 0.63; Cronbach's alpha = 0.88). Overall scores for each construct were determined by computing the average responses to the items defining positive affect and negative affect. The correlation between the two factors was -0.26.

Similar to Experiment 3 and Experiment 4, in this experiment, in addition to affect, participants' attitude towards the ad and attitude towards buying the brand were also measured. Attitude towards the ad (A_{ad}) was measured with a three item scale. The scale items were likeable (1 being "not all likeable" and 7 being 'likeable'), favorable (1 being 'unfavorable' and 7 being 'favorable') and appealing (1 being 'unappealing' and 7 being 'appealing'). A factor analysis indicated that these items loaded heavily on a single construct (eigenvalue = 2.47; 82.3% of the variance accounted for; minimum factor loading = 0.89; Cronbach's alpha = 0.89). Attitude towards buying the brand (A_{br}) was measured using a ten item scale. The scale items were very good (1 being "very bad" and 7 being "very good"), beneficial (1 being "not beneficial" and 7 being 'beneficial'), important (1 being 'unimportant' and 7 being 'important'), wise (1 being 'foolish' and 7 being 'wise'), unattractive (1 being 'unattractive' and 7 being 'attractive'), useful (1 being 'useless' and 7 being 'useful'), desirable (1 being 'undesirable' and 7 being 'desirable'), valuable (1 being 'worthless' and 7 being 'valuable'), needed (1 being "not needed" and 7 being 'needed') and positive (1 being 'negative' and 7 being 'positive'). A factor analysis indicated that these items loaded on a single construct (eigenvalue = 6.53; 65.3% of the variance accounted for; minimum factor loading = 0.68; Cronbach's alpha = 0.94).

Results

A MANOVA with positive affect and negative affect as the dependent variables revealed a significant difference across the groups on one or more of the dependant variables, Wilks $\lambda = 0.71$, $F(4, 292) = 13.38$, $p < .001$. A separate

ANOVA was conducted for both positive affect and negative affect. The results of the ANOVA indicated that in terms of positive affect, there was a significant difference across the groups, F (2, 147) = 14.90, $p <.001$. The Levene test statistic was 1.98 with 2 and 147 degrees of freedom, *ns*. This indicates that the variances across the groups were not different and that the results of the ANOVA are acceptable. In terms of negative affect, there was a significant difference across the groups, F (2, 147) = 17.97, $p < .001$. The Levene test statistic was 3.84 with 2 and 147 degrees of freedom, $p <.05$. This indicates that the variances across the groups were not equal. A more robust test that considers the heterogeneity of variances (the Welch test) was conducted to test the equality of the means across the groups. The Welch test statistic was 18.14 with 2 and 95.73 degrees of freedom, $p < .001$. This indicates that there was a difference across the groups in terms of negative affect.

Mean results by condition and type of affect are presented in Table 32. Further analyses of the difference of means between groups are reported below for both positive and negative affect.

Positive Affect Scale. The results support the compensatory mechanism proposed in hypothesis 5 (a) and 5 (b). The 1 Pos-1 Neg condition was lower than the 3 Pos-1 Neg condition, t (98) = 2.20, $p < .05$ and higher than the 1 Pos-3 Neg condition, t (98) = 3.31, $p < .01$. The 3 Pos-1 Neg condition was higher than the 1 Pos-3 Neg condition, t (98) = 5.43, $p < .001$.

Negative Affect Scale. The results support the compensatory mechanism proposed in hypothesis 5 (a) and 5 (b). The 1 Pos-1 Neg condition was higher than the 3 Pos-1 Neg condition, *t* (98) = 2.93, $p < .01$ and lower than the 1 Pos-3 Neg condition, *t* (98) = 3.06, $p < .01$. The 3 Pos-1 Neg condition was lower than the 1 Pos-3 Neg condition, *t* (98) = 5.98, $p < .001$.

TABLE 32

Affective Response, Attitude Towards the Ad and Attitude Towards Buying the Brand By Condition (Experiment 5)

	1 Positive- 1 Negative (n=50)	3 Positive- 1 Negative (n=50)	1 Positive- 3 Negative (n=50)	ANOVA *F* (2, 147)
Positive Affect Scale	3.04a[1] (1.11)	3.56b (1.23)	2.35c (0.99)	14.90*
Negative Affect Scale	2.42a (1.12)	1.83b (0.90)	3.17c (1.31)	17.97*
A_{ad}	3.79a (1.44)	3.95a (1.36)	3.57a (1.32)	0.96
A_{br}[2]	4.50a (1.14)	4.42a (0.95)	4.30a (1.00)	0.47[3]

Note. All means are based on scales with values ranging from 1 to 7. Standard deviations within each cell are indicated in parentheses.

[1] Cells in the same row with unlike subscripts differ at $p < .05$.

[2] For the A_{br} measure there were 49 responses in each of the 3 Pos-1Neg and 1 Pos-3 Neg conditions.

[3] ANOVA *F* (2,145).

* $p < .001$.

Attitude Towards the Ad. The means across the conditions are provided in Table 32. An ANOVA with attitude towards the ad as the dependent variable indicated that there no significant difference across the groups, F (2, 147) = 0.96, *ns*.

Attitude Towards Buying the Brand. The means across the conditions are provided in Table 32. Two of the participants did not provide responses to the attitude towards buying the brand measures. There were 50 responses in the 1 Pos-1 Neg condition, 49 responses in the 3 Pos-1Neg condition and 49 responses in the 1 Pos-3 Neg condition. An ANOVA with attitude towards the buying the brand as the dependent variable indicated that there no significant difference across the groups, F (2, 145) = 0.47, *ns*.

Regression Analyses

In order to further demonstrate that a compensatory mechanism is operating and both the positive affective stimuli (the positive images) and the negative affective stimuli (the negative images) have an impact on positive affect and negative affect experienced, two separate linear regression analyses were conducted with the combined data from all the experimental conditions.

In the first regression model, the dependent variable was positive affect and the explanatory variables were the total affective value of the positive images and the total affective value of the negative images in the advertisement. Affective values of the images were obtained from the pre-test. As the scale used in the pre-test was a bi-polar scale, the values of the negative images were reverse coded to indicate their level of negativeness. The total affective value of the positive images was obtained by summing the affective values of the positive images in the advertisement. Similarly, the total affective value of the negative images was obtained by summing the affective values of the negative images in the advertisement. The regression model was estimated with the data from all 150 respondents across the three groups. The model was significant as can be seen from the analysis of variance table (Table 33).

Table 33

Analysis of Variance Table for Regression Model
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Positive Affect
Data Set: All Conditions (Experiment 5)

	Sum of Squares	df	Mean Square	F	*p* value
Model	37.51	2	18.75	15.21	$p < .001$
Error	181.31	147	1.23		
Total	218.82	149			

The regression coefficients are provided in Table 34. The total affective value of both positive images and negative images were significant indicating that both these variables impacted positive affect. This supports the proposed compensatory mechanism. The results indicate that an increase in the total affective value of the positive images increases positive affect. In other words, an increase in the total positiveness of the positive images increases the positive affect experienced. The results also indicate that a decrease in the total affective value of the negative images increases positive affect. Thus, the model implies that a decrease in the total negativeness of the negative images increases the positive affect experienced. These results support the frequency effects hypothesis.

TABLE 34

Regression Coefficients
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Positive Affect
Data Set: All Conditions (Experiment 5)

Variable	Regression Coefficient	Standard Error	*t* value	*p* value
Intercept	3.12	0.33	9.43	$p < .001$
Positive Images (Total Affective Value)	0.11	0.05	2.39	$p < .05$
Negative Images (Total Affective Value)	- 0.13	0.04	- 3.14	$p < .01$

In the second regression model, the dependent variable was negative affect and the explanatory variables were the total affective value of the positive images and the total affective value of the negative images in the advertisement. The total affective value of the positive images and negative images were obtained similarly to the first regression model. The regression model was estimated with the data from all 150 respondents across the three groups. The model was significant as can be seen from the analysis of variance table (Table 35).

TABLE 35

Analysis of Variance Table for Regression Model
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Negative Affect
Data Set: All Conditions (Experiment 5)

	Sum of Squares	df	Mean Square	F	*p* value
Model	47.84	2	23.92	19.23	$p < .001$
Error	182.89	147	1.24		
Total	230.73	149			

The regression coefficients are provided in Table 36. The total affective value of both positive images and negative images were significant indicating that both these variables impacted negative affect. This also supports the proposed compensatory model. The results indicate that a decrease in the total affective value of the positive images increases negative affect. In other words, a decrease in the total positiveness of the positive images increases the negative affect experienced. The results also indicate that an increase in the total affective value of the negative images also increases negative affect. Thus, the model implies that an increase in the total negativeness of the negative images increases the negative affect experienced. These results also support the frequency effects hypothesis.

TABLE 36

Regression Coefficients
Explanatory Variables: Positive Image, Negative Image
Dependent Variable: Negative Affect
Data Set: All Conditions (Experiment 5)

Variable	Parameter Estimate	Standard Error	*t* value	*p* value
Intercept	2.25	0.33	6.79	$p < .001$
Positive Images (Total Affective Value)	- 0.11	0.05	- 2.50	$p < .05$
Negative Images (Total Affective Value)	0.16	0.04	3.70	$p < .001$

Discussion

The results from the ANOVA analysis are consistent with the theory that when oppositely valenced affective stimuli are combined, an increase in the positive (negative) stimuli increases overall positiveness (negativeness) and decreases overall negativeness (positiveness). These results support frequency effects in oppositely valenced affect integration in a simultaneous presentation context. This is different from the frequency neglect observed in univalence affect integration in a simultaneous presentation context. This is due to the compensatory mechanism operating in oppositely valenced affect integration as opposed to the peak mechanism operating in univalence affect integration. In this experiment, there was no impact of the affective stimuli in the advertisement on attitude towards the advertisement or attitude towards buying the brand.

CHAPTER 5: GENERAL DISCUSSION

Extant affect integration research suggests that non-compensatory mechanisms best describe the way in which we form overall affective impressions of an event, with disproportionate weight being given to the peak and end points. This prior research, however, has almost exclusively focused on the integration of stimuli of a common valence, within a sequential presentation context. Results from the present research indicate that while a peak mechanism might best describe the integration of simultaneously presented stimuli of common valence, a compensatory mechanism best describes the integration of simultaneously presented stimuli of opposite valence. This is true both in the case of oppositely valenced stimuli of the same intensity and oppositely valenced stimuli of differing intensity.

The lack of a non-compensatory mechanism or contrast effect observed in the simultaneous integration of oppositely valenced affective stimuli support the theory that affect is motivational in nature. That is, support exists for the contention that the contrast effect observed in negative-positive sequence (Olsen and Pracejus 2004) is due to the motivational nature of affect (i.e. due to mood repair) and not due to a perceptual contrast, as the removal of the sequence eliminates the contrast effect. Had perceptual contrast been operating in either Experiment 2 or Experiment 3, a very strong contrast effect would have been expected due to the ability of the viewer to directly and repeatedly compare the stimuli.

The results of these studies help to develop an initial picture as to how simultaneously presented stimuli are integrated into overall affective response. First, when multiple stimuli of the same valence are presented simultaneously as in Experiment 1, the most extreme stimuli seems to drive overall affective response. For example, the integration of a high negative and a low negative stimulus generates the same negative affect as a high negative alone. Thus, the addition of a stimulus of similar or lower intensity does not impact overall response. This is referred to as the peak effect and is similar to the non-compensatory mechanism found in sequential affect integration. This is also demonstrated in Experiment 2, which indicates that when two same valence stimuli are of similar intensity, there appears to be no additive effect. The results from Experiment 1 and Experiment 2 provide insight into predicting frequency neglect when combining univalence affective stimuli.

In addition, this research also sheds light on the integration of positive and negative stimuli under simultaneous presentation. The compensatory mechanism witnessed in both Experiment 2 and Experiment 3 is interesting on two fronts. First, prior affect integration research has, in most cases, reported non-compensatory findings. Second, of note, whereas most models of information integration suggest that non-compensatory processes operate when there is simultaneous presentation of cognitive information (see e.g., Hogarth and Einhorn 1992), in the case of simultaneous presentation of affective information a compensatory effect is observed. This further underscores the need to consider affect integration and cognitive information integration as distinct. The compensatory mechanism found in Experiment 2 and Experiment 3 also provides insights into predicting frequency effects when combining oppositely valenced affective stimuli.

The findings from Experiment 4 and Experiment 5 demonstrate different effects of the frequency of affective stimuli in univalence and oppositely valenced affect integration in a simultaneous presentation context. Frequency neglect is observed in affect integration of univalence stimuli, while frequency effects are observed in affect integration of oppositely valenced stimuli. This provides further evidence that the mechanisms for affect integration for univalence stimuli and oppositely valenced stimuli are different.

Across the five experiments, factor analysis with oblique rotation consistently revealed two factors (one comprising positive affect and the other comprising negative affect). The factor analysis results show that positive and negative affect are independent constructs that are weakly to moderately correlated. Across the experiments, the correlation between positive and negative affect ranged from -0.26 to -0.50. This supports the theory that positive and negative affect are distinct factors that should be measured separately (see e.g., Watson and Tellegen 1985; Larsen, McGraw, and Cacioppo 2001).

The results from this research offer interesting implications for marketing practitioners. In terms of advertising, it clearly implies that mode of presentation has an impact on the mechanism through which the advertisement is processed. For advertisements that utilize simultaneous presentation (such as print or outdoor advertising), managers need to be aware of the affective stimuli within the advertisement. In cases where there are only positive affective stimuli within the advertisement, it would be beneficial to emphasize only one positive affective stimulus (e.g., one dominant image) as there is no additive effect in terms of affective response of having multiple positive stimuli. This is also true for advertisements that have only negative affective stimuli (e.g., social marketing advertisements such as anti-smoking ads). In cases where there are both positive and negative affective stimuli within the advertisement presented simultaneously, in order to have a net positive affective impact it is required that there be more positive stimuli than negative stimuli. The findings from this research can also be useful for other areas of marketing, particularly related to consumption situations. Marketing managers need to be aware that the same consumption experience may evoke both positive and negative emotions and consumers will use a compensatory mechanism to arrive at overall affective evaluation of the consumption experience.

These experiments also open avenues for future research. A limitation of the studies presented here is their focus on valence and intensity of emotions. Although thinking of affect from a valence and arousal perspective has merit (Russell 1980), other research has demonstrated the importance of examining specific emotions (e.g., Raghunathan and Pham 1999, Lerner and Keltner 2000). Combing the same positive emotion (e.g. 'joy') with different negative emotions (e.g. 'sadness' or 'anxiety') may lead to differing outcomes. Examining the integration of particular emotions may reveal that the nature of integration is a function of the type of emotions one combines (e.g., it is possible that "high fear" overrides all other emotions).

Another limitation of this research is the primary focus on only one type of dependent measure - affective response. Given that the objective of this research is to understand affect integration, it is natural that the key measure of interest was affective response. Attitude towards the ad and attitude towards buying the brand were also measured in the last three experiments in order to assess whether there was an impact of the affective stimuli in the advertisements on attitude measures. In two of the last three experiments, the findings provide support for the impact of affective stimuli on attitude towards the ad. However, on this measure, the compensatory effect was not observed in the conditions where mixed valence affective stimuli were combined. This supports the premise that affective response and attitudes are distinct constructs. Support for the impact of affective stimuli on attitude towards buying the brand was evidenced in only one of the last three experiments. The lack of effects on the attitude towards buying the brand may be a consequence of the stimuli used. As an established brand name was used which should have positive attitudes among the participants, one exposure to an affect generating advertisement was not enough to significantly change attitude towards buying the brand. The scope of this study was to propose hypotheses and investigate the impact on affective measures. The impact of affective stimuli on attitude (both towards the ad and brand), purchase intentions and other advertising effectiveness measures (e.g., recall and recognition) may be examined further in future studies.

A separate avenue of future research in affect integration is to examine the integration of different types of affective stimuli, particularly in a sequential presentation context. Previous research in affect integration of oppositely valenced stimuli in a sequential presentation context has demonstrated non-compensatory outcomes, with a preference for improving trends (i.e., a negative-positive sequence is preferred to a positive-negative sequence). However, this may be dependent on the type of the stimuli being integrated. The previous research in sequential integration of affective stimuli has used auditory stimuli (Olsen and Pracejus 2004) or stimuli based on taste and smell (Lau-Gesk 2005). Different results may be observed when integrating visual affective stimuli, as visual stimuli have very strong impacts on memory (see e.g, Paivio 1969). The preference for a positive-negative sequence may be observed when integrating visual stimuli, as the salient positive visual stimuli can be used to cope with the incoming negative visual stimuli. This needs to be investigated empirically. A direct comparison of simultaneous versus sequential presentation of visual affective stimuli is also worthwhile to examine. Such a comparison was not conducted in these experiments.

This study investigated affect integration in a simultaneous presentation context, however the exact sequence of the processing of the images by individuals was not examined. Across the first three experiments, the order of affective stimuli (position of the images on the page) was counterbalanced, and there were no order (position) effects in any of the experiments. Nonetheless, eye-tracking evidence would provide useful insights into the exact sequence of the processing and indicate whether there is systematic processing of the stimuli in terms of order (e.g., processing the images left to right similar to text) or type of stimulus (e.g., negative stimuli processed first). The use of memory based measures such as recall and recognition may also help in further understanding the process mechanisms involved.

This research presents the first work to examine affect integration under simultaneous presentation of visual affective stimuli. It is also the first study to investigate the impact on affective responses of multiple pictures of negative or opposite valence in a print advertisement. An interesting picture of the process is emerging, which is consistent with, but different from the sequential presentation literature. It is hoped that these intriguing findings will spur greater interest in understanding how people respond to simultaneously presented affective stimuli.

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Appendix A: Questionnaire
(With Affective Measures)

Below please rate how the ad you just saw made you feel. For each statement, please let us know on the scale how much you experienced the feeling while viewing the ad.

1. I had unpleasant feelings viewing the ad.

Not at all 1 2 3 4 5 6 7 Very strongly

2. The ad made me feel happy.

Not at all 1 2 3 4 5 6 7 Very strongly

3. I was disgusted by the ad.

Not at all 1 2 3 4 5 6 7 Very strongly

4. I ad made me feel good.

Not at all 1 2 3 4 5 6 7 Very strongly

5. I was fearful viewing the ad.

Not at all 1 2 3 4 5 6 7 Very strongly

6. The ad made me feel bad.

Not at all 1 2 3 4 5 6 7 Very strongly

7. The ad made me feel angry.

Not at all 1 2 3 4 5 6 7 Very strongly

8. The ad made me feel joyful.

Not at all 1 2 3 4 5 6 7 Very strongly

9. I had pleasant feelings viewing the ad.

Not at all 1 2 3 4 5 6 7 Very strongly

10. The ad made me feel sad.

Not at all 1 2 3 4 5 6 7 Very strongly

Appendix B: Layout of Ad with 1 Image (Experiment 1, 2 and 3)

(Note: Size Reduced to Fit Margins)

Image

For over 75 years, [Brand Name] has been the leading choice of photojournalists. The images captured are not always pretty, but they are always of high quality. [Brand Name] builds a camera with a reputation for being reliable even under the most difficult conditions.

Trust the camera that has been trusted.

Photograph of Camera Model

Appendix C: Layout of Ad with 2 Images (Experiment 1, 2 and 3)

(Note: Size Reduced to Fit Margins)

Image 1

Image 2

For over 75 years, [Brand Name] has been the leading choice of photojournalists. The images captured are not always pretty, but they are always of high quality. [Brand Name] builds a camera with a reputation for being reliable even under the most difficult conditions.

Trust the camera that has been trusted.

Photograph of Camera Model

Appendix D: Layout of Ad with 1 Image (Experiment 4)

(Note: Size Reduced to Fit Margins)

Image

For over 75 years, [Brand Name] has been the leading choice of photojournalists. The images captured are not always pretty, but they are always of high quality. [Brand Name] builds a camera with a reputation for being reliable even under the most difficult conditions.

Trust the camera that has been trusted.

Photograph of Camera Model

Appendix E: Layout of Ad with 3 Images (Experiment 4)

(Note: Size Reduced to Fit Margins)

Image 1

Image 2

Image 3

For over 75 years, [Brand Name] has been the leading choice of photojournalists. The images captured are not always pretty, but they are always of high quality. [Brand Name] builds a camera with a reputation for being reliable even under the most difficult conditions.

Trust the camera that has been trusted.

Photograph of Camera Model

Appendix F: Layout of Ad with 2 Images (Experiment 5)

(Note: Size Reduced to Fit Margins)

Image 1

Image 2

For over 75 years, [Brand Name] has been the leading choice of photojournalists. The images captured are not always pretty, but they are always of high quality. [Brand Name] builds a camera with a reputation for being reliable even under the most difficult conditions.

Trust the camera that has been trusted.

Photograph of Camera Model

Appendix G: Layout of Ad with 4 Images (Experiment 5)

(Note: Size Reduced to Fit Margins)

Image 1

Image 2

Image 3

Image 4

For over 75 years, [Brand Name] has been the leading choice of photo-journalists. The images captured are not always pretty, but they are always of high quality. [Brand Name] builds a camera with a reputation for being reliable even under the most difficult conditions.

Trust the camera that has been trusted.

Photograph of Camera Model